Final Remedial Design

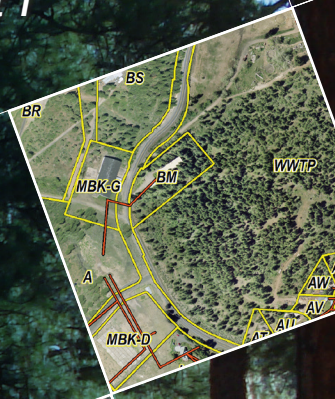
TECHNICAL SPECIFICATIONS

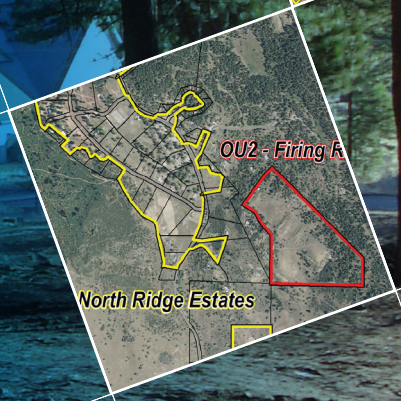
North Ridge Estates Site

KLAMATH COUNTY, OR

Operable Unit 1

DECEMBER 2015





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

CDM Smith

U.S. Environmental Protection Agency
Region 6 Remedial Action Contract
No. EP-W-06-004, Task Order No. RDRD-10BT

Final Technical Specifications
North Ridge Estates Superfund Site
Operable Unit 1

EPA Remedial Project Manager: **Ms. Linda Meyer**
CDM Smith Project Manager: **Mr. Derek Wintle, P.E.**
EA Program Manager: **Ms. Sarah Babcock, P.E.**

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Prepared for:
U.S. Environmental Protection Agency
Region 10
1200 6th Avenue, Suite 900
Seattle, WA 98101

EXPIRES: 6/30/2016

Prepared by:
CDM Federal Programs Corporation
555 17th Street, Suite 1200
Denver, CO 80202

and

EA Engineering, Science, and Technology, Inc., PBC
5655 S. Yosemite Street, Suite 320
Greenwood Village, CO 80111

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.1 SCOPE OF SECTION

This section defines the work covered by the contract, including the project description, location, and work required by the contract; existing conditions; location of underground facilities; and coordination requirements. This section does not provide the technical detail for particular work activities, but describes the work as a whole, providing overall perspective to the separate tasks and their interrelationships. This Section shall be used in conjunction with all other sections and the attachments thereto to establish the total work requirements.

1.2 DEFINITIONS

1.2.1 RA Construction Manager

The term "RA Construction Manager" shall mean the representative of the RA Contractor's company, firm, corporation, or other legal entity entering into a contract with the U.S. Environmental Protection Agency to perform the remedial action.

1.2.2 Excavation and Restoration (E&R) Contractor

The term "Excavation and Restoration Contractor" shall mean the company, firm, corporation, or other legal entity entering into a subcontract with the RA Construction Manager's company, firm, corporation, or other legal entity to perform the remedial action. For simplicity purposes, this includes all of the E&R Contractor's subcontractors.

1.2.3 Government

The term "Government" shall refer to the U.S Environmental Protection Agency in consultation with the Oregon Department of Environmental Quality and the U.S. Army Corps of Engineers.

1.2.4 Receiver

The 2006 consent decree appointed a Receiver, Dan Silver of Olympia, Washington, to manage and hold title to the properties, excluding properties that are privately owned. These properties are vacant lots or are unoccupied homes.

1.2.5 Homeowner, Parcel Owner, or Property Owner

Owner of privately-held residential parcel(s) within the work boundaries.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

1.3.1 Project Description

The work includes all labor, materials, tools, equipment, supplies, testing, transportation, services, and superintendence for the E&R

Contractor to implement the remedial action as shown on the Contract Drawings and described in these Technical Specifications for the North Ridge Estates (NRE) Superfund Site Operable Unit 1 (OU1), Klamath County, Oregon.

The primary contaminant of concern (COC) at OU1 is asbestos. In addition, arsenic contamination is present in soils at the OU1 former power plant location. The OU1 site boundary defines the known horizontal extent of asbestos-containing material (ACM) and asbestos-contaminated soil. OU1 encompasses the footprint of former Marine Recuperation Barracks (MRB) and includes approximately 125 acres.

1.3.2 Location

OU1 (Comprehensive Environmental Response, Compensation, and Liability Information System Number ORN001002476) is located on the outskirts of the City of Klamath Falls, in Klamath County, in Southern Oregon. Specifically, the site is located at the intersection of Old Fort Road and North Ridge Drive.

OU1 is named after the North Ridge Estates residential subdivision built on a portion of the property residing in the site boundary. The site is largely composed of residential properties that are either privately owned or managed by a court-appointed Receiver (referred to as Receiver-managed parcels).

1.3.3 Work Required by Contract

Work required by contract shall be conducted throughout three construction seasons, as generally defined in the Contract Drawings. This construction sequencing was developed to mitigate to the extent practicable the potential for cross-contamination between seasons by conducting excavation work from higher to lower elevations and to use roadways as natural breaklines. The work includes, but shall not be limited to, the following general activities:

a. Access Agreements and Resident Relocation Consent:

The RA Construction Manager will provide property access agreements and right-of-way agreements with Klamath County for all RA activities to be conducted on private properties within NRE OU1 site. Temporary relocation of residents will be required on a parcel-specific basis; however, this will be coordinated by the RA Construction Manager. Communication with the community will be the responsibility of the RA Construction Manager. The E&R Contractor shall provide security arrangements at these properties during remedial activities.

b. Pre-Construction Activities:

Pre-construction activities consist of tasks that require completion following Notice to Proceed and prior to Remedial Action (RA) mobilization. RA cannot begin until pre-construction activities are complete. The following list provides a summary of the pre-construction plans that shall be provided prior to RA mobilization.

1. Project Schedule: Develop a preliminary project schedule in accordance with Section 01 32 01 PROJECT SCHEDULE.

2. Submittal Register: Update the preliminary submittal register and submit in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

3. Site Safety and Health Plan (SSHP): Develop and implement a SSHP in accordance with Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE.

4. Perimeter Air Monitoring Plan (PAMP): Develop and implement a PAMP in accordance with 01 36 20 PERIMETER AIR MONITORING.

5. Contractor Quality Control Plan (CQCP): Prepare a CQCP in accordance with Section 01 45 00 QUALITY CONTRACTOR CONTROL.

6. Sampling and Analysis Plan (SAP): Prepare a SAP in accordance with Section 01 45 10 CHEMICAL DATA QUALITY CONTROL.

7. Construction Site Plan (CSP): Prepare a CSP in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

8. Traffic Control Plan (TCP): Prepare a TCP in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

9. Environmental Protection Plan (EPP): Prepare an EPP in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION.

10. Diesel Emission Control Technology Implementation Plan (DECTP): Prepare a DECTP in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION.

11. General Demolition Plan (GDP): Prepare a GDP in accordance with Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

12. Septic System Installation Plans (SSIP): Prepare a SSIP in accordance with Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

13. Excavation Work Plan (EWP): Prepare a EWP in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

14. Borrow Source Work Plan (BSWP): Prepare a BSWP in accordance with Section 31 23 00 EARTHWORK AND FILL.

c. Mobilization:

Mobilization of the E&R Contractor's personnel, craft labor, materials, tools, equipment, and supplies to and from the project site.

d. Site Preparation:

Establish temporary construction facilities, such as equipment and material storage areas, access and haul routes, and avenues of ingress/egress storage and parking areas in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

Ensure that each contaminated soil excavation area is set up into three distinct work zones; the exclusion zone; the contamination reduction zone; and the support zone in accordance with the site-specific SSHP and Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE. In addition, temporary asbestos disposal warning signage

shall be installed along the perimeter of the on-site repositories until project completion and shall be installed in accordance with Section 01 58 13 TEMPORARY SIGNAGE. Additional project signage shall be installed as indicated on the Contract Drawings.

Protect existing utilities, structures, outbuildings, foundations, and improvements as indicated on the Contract Drawings during all work phases at the site in accordance with Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

e. Clearing and Grubbing:

Clearing and grubbing work at OU1 and Parcel H shall be performed by the E&R Contractor in accordance with Section 31 11 00 CLEARING AND GRUBBING. Clearing work at the ODOT borrow source area shall be performed by the RA Construction Manager.

f. Excavation of Restoration Fill Material at Borrow Source Locations:

Two government-furnished borrow source locations are provided as indicated on the Contract Drawings. The ODOT borrow source must first be utilized to its full borrow source capacity, followed by the Parcel H borrow source.

Delineate the extent of the Parcel H borrow source, once the ODOT borrow source has been exhausted, as shown on the Contract Drawings. The ODOT borrow source shall be delineated and trees cleared by the RA Construction Manager prior to mobilization in Year 1. Topsoil material at both borrow source areas shall be stripped and stockpiled for restoration activities in accordance with Section 31 23 00 EARTHWORK AND FILL.

All borrow materials shall be processed outside of the limits of the OU1 site to avoid cross-contamination of borrow materials. As indicated on the Contract Drawings, construct, improve, and maintain haul roads from the borrow source locations to OU1 and implement dust control. Process soil from the borrow source areas and amend to achieve the required gradation soils to provide restoration fill material for backfill and the frost protective cap in accordance with Section 31 23 00 EARTHWORK AND FILL.

Install erosion control features to protect these soil stockpiles in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

If both government-furnished borrow sources are exhausted prior to project completion, an E&R Contractor furnished borrow source shall be obtained and approved by the RA Construction Manager. The E&R Contractor is encouraged to contact the two private parcel owners adjacent to the western boundary of the Parcel H borrow source to obtain additional borrow material, as needed. Borrow material generated from these properties is considered suitable for use in accordance with Section 31 23 00 EARTHWORK AND FILL.

g. Demolition and Restoration of Site Features:

Demolish, dispose, relocate, and/or return site features, such as fences, walkways, driveways, and septic systems, in order to remove contaminated soil from each parcel as indicated on the Contract

Drawings and in accordance with Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES and Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

h. Excavation of Contaminated Soil from Parcels:

Excavate contaminated soils from within the footprint of OU1 as shown on the Contract Drawings and in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL. Transport and dispose of all excavated contaminated soils in the on-site repositories. Perform visible confirmation with the RA Construction Manager to ensure that ACM has been removed.

Contaminated soil left-in-place (e.g., under covered decks, deeper than 4 feet below ground surface [bgs], around trees stands to be protected) shall be surveyed and documented on the as-built drawings in accordance with Section 01 71 23 CONSTRUCTION SURVEYING.

Legacy Tree Protection Areas are delineated on the Contract Drawings and will be confirmed by the RA Construction Manager prior to excavation work. These areas require a non-mechanical excavation approach in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED SOIL.

Contaminated material not excavated from beneath covered decks shall be covered with a geomembrane as shown on the Contract Drawings and in accordance with Section 02 05 20 WASTE CONTAINMENT GEOMEMBRANE.

Visible contamination left-in-place at 4 feet bgs shall be covered with rubblized concrete in accordance with Section 31 23 00 EARTHWORK AND FILL and an orange geotextile warning fabric in accordance with Section 02 05 10 MARKER BARRIER GEOTEXTILE.

i. Consolidation of Contaminated Material within the Onsite Repositories:

Transport and dispose of contaminated material in the onsite repositories in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL, Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES, and Section 31 11 00 CLEARING AND GRUBBING.

j. Post-Excavation Wash of Hard Surfaces:

Wash or rinse hard surfaces adjacent to excavation areas, including building siding, driveways left in place, or roadways, following completion of contaminated soil excavation using available water sources to remove any dust or other debris left on hard surfaces. Post-excavation washing shall be completed prior to restoration activities to mitigate cross-contamination concerns in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

k. Installation of the Frost Protective Cap and Restoration of Parcels:

Restore the excavated area by installing a frost protective cap and restoring property features as shown on the Contract Drawings. Installation of the frost protective cap shall be required prior to the end of each construction season. Restoration activities shall occur in accordance with Section 31 23 00 EARTHWORK AND FILL, Section 32 12 17 HOT MIXED ASPHALT CONCRETE (ASPHALT), Section 03 30 00

CAST-IN-PLACE CONCRETE, Section 32 92 19 GROWTH MEDIA AND SEED, and Section 33 42 00 CULVERTS. Site features indicated on the Contract Drawings to be relocated or removed, as described in Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES, shall be returned to a location as indicated on the Contract Drawings or replaced.

l. Interior Surface Cleaning in Houses - By Others:

Following placement of the frost protective cap at each parcel, post-RA indoor air sampling shall be completed by the RA Construction Manager. Coordinate sequence of restoration activities with the RA Construction Manager in accordance with Section 01 32 01 PROJECT SCHEDULE.

m. Installation of Temporary Controls at Each Active Repository between Construction Seasons:

Prior to completion of each construction season, install a 6-inch temporary soil cap at each active repository. The temporary soil cap shall be installed in accordance with Section 31 23 00 EARTHWORK AND FILL. It is anticipated that the Memorial Park repository will be completed during a single construction season to minimize the need for this temporary soil cover.

n. Installation of the Frost Protective Cap At Each Completed Repository:

Install the 2-foot frost protective cap as shown on the Contract Drawings and in accordance with Section 01 57 23 TEMPORARY EROSION CONTROL, Section 31 23 00 EARTHWORK AND FILL, and Section 32 92 19 GROWTH MEDIA AND SEED upon completion the contaminated material consolidation activities. Temporary signage, as described in Section 01 58 13 TEMPORARY SIGNAGE, shall be disassembled, washed, and removed from the worksite.

o. Demobilization:

Demobilize of the E&R Contractor's personnel, labor, materials, tools, equipment, and supplies to and from the project site. Cleanup temporary construction facilities in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

p. Project Closeout:

Upon completion of each season of the project, submit project closeout documents. These documents include as-built drawings for all parcels completed and a seasonal closeout report in accordance with Section 01 78 00 CLOSEOUT SUBMITTALS.

1.4 EXISTING CONDITIONS

The site contains features that shall be protected by the E&R Contractor during implementation of the work that includes the following:

a. Remove or alter existing site features in such a manner as to prevent injury or damage to any portions of the existing site features that remain.

b. Repair or replace portions of existing site features (e.g., underground electric and water lines) that have been altered during

construction operations to match existing or adjoining work, as approved by the RA Construction Manager. At the completion of operations, existing site features shall be in a condition equal to or better than that which existed before new work started.

c. Protect existing site features, utilities, and appurtenances; historic and cultural resources; and environmental resources as indicated in the Contract Drawings and in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

1.5 LOCATION OF UNDERGROUND FACILITIES

The E&R Contractor shall be responsible for the following:

a. Contacting the Oregon Utility Notification Center (1-800-332-2344) prior to any excavation activities.

b. Locating all utilities onsite, including the septic systems as shown on the Contract Drawings.

c. Marking and protecting existing utilities, unless otherwise indicated on the Contract Drawings.

d. Verifying the locations and depths of existing piping (e.g., watermains), utilities, and any type of underground obstruction not removed, but indicated or discovered during utility clearance, in locations to be traversed by work to be conducted or installed.

1.6 COORDINATION REQUIREMENTS

1.6.1 Public Access

Limit and control public access to active work areas of the site when work is occurring at the site and until completion of work in accordance with the traffic control plan in Section 01 57 20 ENVIRONMENTAL PROTECTION.

1.6.2 Private Property Access and Protection

The RA Construction Manager will provide access to private properties. The RA Construction Manager will provide the E&R Contractor with private property access agreements and notification allowing excavation and restoration of contaminated materials at each property as shown on the Contract Drawings (e.g., site features, septic system, etc.). This information shall be maintained on site. No work can be performed on private property without an access agreement.

1.6.3 Resident Relocation

Resident relocation will be evaluated and coordinated by the RA Construction Manager on a parcel-specific basis and will be deemed appropriate when significant excavation affects landowner safety due to concern with open excavation areas, heavy equipment activity, and requirements for development of exclusion zones or site work areas as well as overall construction efficiency. The RA Construction Manager will coordinate with the E&R Contractor for parcels that require resident relocation prior to remedial activities; the E&R Contractor shall not coordinate or communicate with the residents unless as directed by the RA Construction Manager. Provide security for these vacated homes during

off-hours (i.e., overnight, weekends, holidays). Maintenance of these homes (i.e., watering plants, taking in mail) while vacated will be the responsibility of the RA Construction Manager.

Parcel sequencing methods of construction for Parcels AM, AQ, BM, BO, BR, BS, F, H, MBK-G, N, P, and WWTP shall be performed to provide continued access to residents during construction, or to limit amount of time residents are temporarily relocated. This may include temporary access road construction or phasing work at parcels.

1.6.4 Work within County Road Right-of-Way

The RA Construction Manager and the E&R Contractor shall meet in person with the Klamath County Public Works Director to discuss proposed excavation work and scheduling excavation activities near these services. In addition, determine any additional right-of-way requirements (i.e., traffic control, temporary relocation of street signage, etc.). Klamath County Roads Department point of contact is Stan Strickland, Director of Public Works (541) 883-4696.

1.6.5 Work around Underground Watermains, Water Laterals, and Water Meters

The RA Construction Manager and the E&R Contractor shall meet with the City of Klamath Falls Water Divisions for work around active watermains, water laterals, and water meters. These coordination requirements include, at a minimum, meeting the utility provider in person to discuss proposed excavation work, coordinating inspection when appropriate, scheduling excavation activities near these services, and proposing damage mitigation strategies. City of Klamath Falls Water Division point of contact is Randy Travis, Water Manager (541) 883-5388.

1.6.6 Water Usage for Dust Suppression and Other Construction Activities

The E&R Contractor shall coordinate water usage for dust control activities with the Klamath Falls Water Division. These activities shall include, but are not limited to, procuring water meters, coordinating anticipated daily water use, and understanding limitations on water zones and total daily volume. City of Klamath Falls Water Division point of contact is Randy Travis, Water Manager (541) 883-5388.

1.6.7 Work around Cable Services

The RA Construction Manager and the E&R Contractor shall meet with Charter Cable for work around underground cable services. These coordination requirements include, at a minimum, meeting the utility provider in person to discuss proposed excavation work, scheduling excavation activities near these services, and proposing damage mitigation strategies. Charter Cable point of contact is (800) 332-2344 or 811 at least 48 hours before you dig.

1.6.8 Work around Power Services

The RA Construction Manager and the E&R Contractor shall meet with Pacific Power for work around underground power services or adjacent any power poles or guy wires. These coordination requirements include, at a minimum, meeting the utility provider in person to discuss proposed excavation work, scheduling excavation activities near these services, coordinating inspection when necessary, and proposing damage mitigation strategies. Work must be performed in accordance with the Oregon Overhead Line Safety Act which governs activities by "non-electrically qualified" individuals

around overhead high-voltage power lines. Any interruptions in power sources to residences require coordination with the RA Construction Manager and the property owner prior to disconnection. Pacific Power point of contact is Jay Neil, District Operations Manager (541) 883-7824 or 811 at least 48 hours before you dig.

1.6.9 Work around Building Service Utilities

The RA Construction Manager and the E&R Contractor shall meet with Klamath County Building and Planning Department for all excavation work that impacts site grading; propane tanks; oil tanks; and heating, ventilation, and air conditioning (HVAC) units and the re-installation to a functioning service of these features. Klamath County Building and Planning Department point of contact is Greg Seger, Building Division Manager (541) 883-5121.

1.6.9.1 Work Replacing Septic Systems

The RA Construction Manager and the E&R Contractor shall meet with the Klamath County Onsite Program (septic system inspections) for all septic systems to be replaced. Klamath County On-Site Program point of contact is Debbie Lawhorn, Program Manager (541) 883-5121 ext. 3061.

1.6.10 Offsite Material Disposal

RA activities at OU1 will create multiple waste streams that require offsite disposal, in accordance with CERCLA Off-Site Rule requirements, that include the following:

a. General Refuse: General refuse will be collected onsite and disposed at an approved offsite location. Local waste management services exist that provide weekly, once a month, or on-call garbage service. Dumpster(s) may be stored near the project office area and can include rear load containers or roll-off drop boxes.

b. Scrap Metal Recycling: Scrap metal will be decontaminated, segregated and recycled at an approved offsite location. Local waste management services exist that provide recycling options.

c. Personal Protective Equipment (PPE): PPE, such as Tyvek suits, gloves, respirator cartridges, used during RA activities will be considered contaminated with asbestos. PPE will be wetted, double-bagged, and disposed of at an approved offsite location as asbestos-contaminated material. The closest approved landfill that accepts asbestos contaminated material is Klamath County Solid Waste located at 801 Old Fort Road, approximately 2 miles southwest of OU1. Klamath County Landfill contact information is (541)-883-4697.

d. General Demolition Debris: General demolition debris, such as wood, non-asbestos roofing, and non-recyclable plumbing shall be decontaminated (as needed) and disposed of at an approved offsite landfill. The closest approved landfill that accepts construction and demolition debris is Klamath County Solid Waste located at 801 Old Fort Road, approximately 2 miles southwest of OU1. Klamath County Landfill contact information is (541)-883-4697.

e. Erosion Control Features for Restoration Activities and Borrow Source Work: Non-contaminated erosion control features shall be disposed of at an approved offsite landfill.

Concrete demolition material will be decontaminated of visible soil and rubblized onsite and reused as marker barrier as described in Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

1.7 BORROW SOURCE AVAILABILTY

Two government-borrow source areas, identified as the ODOT and Parcel H Borrow Source areas, are shown on the Contract Drawings. EPA and ODEQ have established an intergovernmental agreement, providing access to the ODOT borrow source area for up to 320,000 bank cubic yards (bcy) of borrow material to be used to generate subsoil, growth media, oversize material, and boulders. The requirements of the intergovernmental agreement are defined in the Borrow Source Work Plan requirements in accordance with Section 31 23 00 EARTHWORK AND FILL. The ODOT borrow source must be utilized first before accessing the Parcel H borrow source. Supplemental, E&R Contractor-furnished borrow sources may be required and must be approved by the RA Construction Manager.

The Parcel H Borrow Source property (tax ID 015B0-00200) is privately owned by the Receiver. Up to an estimated 154,000 bcy of borrow material is available for use in generating subsoil, growth media, oversize material, and boulders. Access to the Parcel H borrow source will be provided by the RA Construction Manager prior to construction.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

(NOT USED)

-- End of Section --

SECTION 01 20 10

PROJECT MEETINGS

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the requirements for a pre-construction meeting and subsequent weekly meetings during the construction season. Periodic schedule updates will also be provided during these meetings to discuss periodic schedule updates on a weekly basis with application for payment on a monthly basis in accordance with Section 01 32 01 PROJECT SCHEDULE.

1.2 PRE-CONSTRUCTION MEETING

After issuance of the Notice to Proceed (NTP) and within 2 weeks of the start of construction, a pre-construction meeting will be held at OU1 with the RA Construction Manager, E&R Contractor, and the Government. Attendance by the E&R Contractor's superintendent, quality control personnel, safety personnel, and subcontractor's superintendents shall be required.

The purpose of this meeting is to review submittals and submittal register, pre-construction plans, equipment and labor, project schedules and payment, and procurement of materials. The submittal register shall be finalized in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. Questions concerning the administrative requirements or any other aspect of the project may also be addressed.

During this meeting, discuss the quality control procedures to be used for all onsite and offsite work. Additional details are included in Section 01 45 00 CONTRACTOR QUALITY CONTROL.

In addition, discuss how work will be implemented including, but not limited to, work procedures, safety considerations associated with those work procedures, heavy equipment to be used, training to operate equipment, and safety requirements such as training and safety equipment. Additional details are included in Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE.

Unless specified otherwise, submit electronic copies of the following for review 30 calendar days following the Notice to Proceed:

a. Project Schedule, in accordance with Section 01 32 01 PROJECT SCHEDULE.

b. Site Safety and Health Plan (SSHP) in accordance Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE.

c. Environmental Protection Plan (EPP) in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION.

d. Contractor Quality Control Plan (CQCP) in accordance with Section 01 45 00 CONTRACTOR QUALITY CONTROL.

e. Construction Site Plan (CSP) in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

f. Traffic Control Plan (TCP) in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

g. General Demolition Plan (GDP) in accordance with Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

h. Septic System Installation Plan (SSIP) in accordance with Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

i. Excavation Work Plan (EWP) in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

j. Borrow Source Work Plan (BSWP) in accordance with Section 31 23 00 EARTHWORK AND FILL.

1.3 STAKEHOLDER PRE-CONSTRUCTION MEETING

This meeting will occur after the pre-construction meeting. The agenda of this meeting shall include a general overview of RA, construction sequence, as well as a discussion of work to be performed that requires coordination with outside agencies and stakeholders.

Attendees include RA Construction Manager, E&R Contractor, and the Government as well as representatives from Klamath County, City of Klamath Falls, Pacific Power, Charter Cable, Klamath Tribes, and any other entities that will be consulted during the project. Local area residents and North Ridge Estates (NRE) property owners will not be invited to attend.

1.4 WEEKLY PROGRESS MEETINGS

Progress meetings will be held approximately every 7 days, with the first meeting 7 days after the pre-construction meeting, unless otherwise scheduled by the RA Construction Manager.

The RA Construction Manager, E&R Contractor, and the Government are to attend the meeting in person or by conference call and be prepared for discussion of pertinent topics such as deliveries of materials and equipment, progress schedule, status of the work, quality, health and safety, coordination requirements, etc.

Provide a current submittal log and updated progress schedule at each weekly progress meeting in accordance with Section 01 33 00 SUBMITTAL PROCEDURES and Section 01 32 01 PROJECT SCHEDULE.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 General

The RA Construction Manager will schedule and administer the meetings as specified in Paragraph 1.2, 1.3, and 1.4 herein. The RA Construction Manager will prepare agenda and preside at the meetings. The E&R Contractor shall make physical arrangements for and participate at the meetings.

The RA Construction Manager will record the minutes of the meeting, including significant discussions and decisions arising from the pre-construction meeting and subsequent weekly meetings, and within 7 calendar days of the meeting, file the meeting minutes in the project records. The RA Construction Manager will distribute copies electronically to each participant of the meeting and to parties affected by decisions made at the meeting.

-- End of Section --

SECTION 01 27 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 GENERAL

Items required under these Contract Documents but not covered under the bid items shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule. These items include, but are not limited to, the following: the Excavation and Restoration (E&R) Contractor's cost for insurance, licenses, permits, and other similar expenses directly related to and required by these Contract Documents; project-dedicated supervisory staff and equipment; compliance with regulatory requirements; pre-construction and construction period planning; scheduling; preparation, coordination, submittal, and obtaining approval for detail drawings and plans and documents listed in the submittal register not included under the bid items; reporting; administration; meetings; procurement of subcontractors; coordination with utilities, municipalities, subcontractors and disposal facilities; contractor quality control; record survey and grade control; per diem and travel costs for staff; overhead and profit; testing and analysis; inspections and audits; environmental protection; meeting sustainability requirements; project photographs; weather monitoring; site security; record documentation; miscellaneous site restoration; project signs and any other requirements or related miscellaneous items specified under DIVISIONS 1 and 2 and not covered under the bid items.

1.2 APPLICATION FOR PAYMENT

a. Submit electronic file of each Application for Payment in form approved by RA Construction Manager.

b. Content and Format: Use content and format for listing items in Application for Payment as specified 01 33 00 SUBMITTAL PROCEDURES.

c. Submit updated construction schedule and progress report with each Application for Payment.

d. Payment Period: Submit at intervals stipulated in the Agreement or as directed by RA Construction Manager, but no less than 30 days.

e. Substantiating Data: When the RA Construction Manager requires substantiating information, submit data justifying quantities and dollar amounts in question. Include the following with Application for Payment:

    1. Current construction photographs.

    2. Record Documents as specified in Section 01 78 00 CLOSEOUT SUBMITTALS for review by the RA Construction Manager.

    3. Survey data and calculations of quantities.

    4. Geotechnical and laboratory analytical data.

    5. Subcontractor invoices or vendor invoices.

6. Construction documentation reports

f. Retainage: Prior to substantial completion, progress payments will be made for 90 percent of the Work completed (with the balance being retainage). If the Work for a construction season has been 50 percent completed as determined by the RA Construction Manager, and if the character and progress of the Work have been satisfactory to the RA Construction Manager, the E&R Contractor may request in writing to the RA Construction Manager that no further additional retainage will be held for that construction season.

The first portion of the accumulated retainage (50 percent) will be released to the E&R Contractor upon completion of all punch list items based on closeout inspections and satisfactory receipt of all closeout documentation for the construction season. The remaining portion of the retainage (50 percent) will be released to the E&R Contractor upon the RA Construction Manager's verification that all revegetation success criteria have been met as outlined in Section 32 92 19 GROWTH MEDIA AND SEED. Release of retainage shall be requested by the E&R Contractor in writing to the RA Construction Manager with substantiating evidence that conditions for the release of retainage have been met by the E&R Contractor.

1.3 UNIT PRICES

a. Unit Quantities: Quantities and measurements indicated on Schedule of Supplies and Services are only for determining bid price. Actual quantities of work done in accordance with Contract Documents shall determine payment.

b. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services, and incidentals; erection, application, or installation of item of the Work; overhead; and profit.

c. Final payment for work governed by unit prices will be made on basis of actual measurements and quantities accepted by RA Construction Manager multiplied by unit price for work incorporated in or made necessary by the work.

1.4 UNIT COSTS AND LUMP SUM COSTS - DIFFERENT CONSTRUCTION SEASONS

The RA Construction Manager reserves the right to alter the construction sequence of the project based on the availability of funding, weather conditions/constraints, resident requirements, and direction from the Government. With this possibility, parcels may be added, removed, or switched from a given construction season to meet these project demands. The RA Construction Manager agrees to provide a minimum of two weeks of notice for significant changes to the construction sequence to allow for modifications in the E&R Contractor's planning and resourcing. Additional notice will be provided whenever practical and possible.

To facilitate the necessary flexibility in sequencing for the project, unit costs and lump sum costs (e.g., Site Preparation for a given Parcel) must be held without increase over the entire three year duration of the project regardless of the year when the activity is performed. Costs that appear in all three years in the bid table may be priced differently each year to account for escalation in these items only.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 ALL WORK TO SUBMIT PRE-CONSTRUCTION PLANNING DOCUMENTS (BASE BID ITEM CP)

Measurement for this lump sum item shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all work develop and submit pre-construction planning documents shall be made at the lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to develop, submit, revise, coordinate, and obtain approval for all planning documents, including, but not limited to: Baseline Project Schedule, Site Safety and Health Plan (SSHP), Environmental Protection Plan (EPP), Contractor Quality Control Plan (CQCP), Construction Site Plan (CSP), Traffic Control Plan (TCP), General Demolition Plan (GDP), Septic System Installation Plan (SSIP), Excavation Work Plan (EWP), Borrow Source Work Plan (BSWP), Perimeter Air Monitoring Plan (PAMP), Sampling and Analysis Plan (SAP) and other documents required by the Contract Documents and Section 01 33 00 SUBMITTAL PROCEDURES prior to initiating work. This item is only included as a bid item for the first construction season. For construction seasons two and three, revisions and updates to these plans in accordance with Base Bid Item UP - UPDATE PRE-CONSTRUCTION PLANNING DOCUMENTS.

3.2 ALL WORK TO UPDATE PRE-CONSTRUCTION PLANNING DOCUMENTS (BASE BID ITEM UP)

Measurement for this lump sum item shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all work to update and submit pre-construction planning documents for construction seasons two and three shall be made at the lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to update, submit, revise, coordinate, and obtain approval for all planning documents, including, but not limited to: Baseline Project Schedule, Site Safety and Health Plan (SSHP), Environmental Protection Plan (EPP), Contractor Quality Control Plan (CQCP), Construction Site Plan (CSP), Traffic Control Plan (TCP), General Demolition Plan (GDP), Septic System Installation Plan (SSIP), Excavation Work Plan (EWP), Borrow Source Work Plan (BSWP), Perimeter Air Monitoring Plan (PAMP), Sampling and Analysis Plan (SAP) and other documents required by the Contract Documents and Section 01 33 00 SUBMITTAL PROCEDURES prior to initiating work. This item is only included as a bid item for the second and third construction seasons.

3.3 ALL COSTS TO SUBMIT ANNUAL PERFORMANCE AND PAYMENT BOND (BASE BID ITEMS PB)

Measurement for this lump sum item shall include all items described under this bid item and no separate quantity measurement shall be made. Bonding will be executed for the value of a single construction season. The Contracting and Procurement package contains the required bond forms.

Payment for all costs for performance and payment bond requirements shall be made at the lump sum bid price which shall comply with all bonding requirements under the terms of the contract.

3.4 ALL WORK TO MOBILIZE EQUIPMENT AND PERSONNEL ONSITE (BASE BID ITEMS MO)

Measurement for this lump sum item shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all work to mobilize onsite shall be made at the lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to mobilize personnel and equipment required to fulfill contract obligations. Payment for this item shall be made for each construction season. Demobilization of personnel and equipment shall be included in BASE BID ITEMS DM - DEMOBILIZE EQUIPMENT AND PERSONNEL.

3.5 ALL WORK TO ESTABLISH, MAINTAIN, AND REMOVE TEMPORARY FACILITIES AND SIGNAGE (BASE BID ITEMS TF)

Measurement for this lump sum item shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to establish, maintain, and remove temporary facilities and signage at non-parcel specific locations. Work shall include, but is not limited to, traffic control; road maintenance and repair, sanitary facilities, security services, signs, utility services, utility connections, communication services, utility locates and necessary utility protection (for temporary facility areas), field offices and requirements, progress cleaning; housekeeping; fire-prevention facilities, construction fencing, dust control, temporary erosion controls (for temporary facility areas), access and haul routes, site access and egress, pest and rodent control, equipment and material storage areas, decontamination, and refueling facilities in the Contract Documents and Section 01 35 12 ROAD MAINTENANCE AND REPAIR, Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE, Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS, Section 01 57 20 ENVIRONMENTAL PROTECTION, Section 01 57 23 TEMPORARY EROSION CONTROL, and Section 01 58 13 TEMPORARY SIGNAGE. Payment for this item shall be made as a lump sum on a percentage completion as determined by the RA Construction Manager. Temporary controls may only remain at the site upon conclusion of the construction year with written approval of the RA Construction Manager. This bid item includes meteorological monitoring described under Section 01 36 20 PERIMETER AIR MONITORING.

This work element includes all temporary facilities and controls for the site and includes non-parcel specific locations such as borrow areas, field office locations, and repositories. Temporary facilities and controls associated directly with specific parcel remediation shall be captured under the corresponding BASE BID ITEMS PP - PREPARE PARCELS.

3.6 ALL WORK TO PREPARE REPOSITORY FOR CONSOLIDATION WORK (BASE BID ITEMS RP)

Measurement for this unit price item shall be made per acre of repository area prepared for consolidation work as measured by the plan view of the

survey after work is completed with no allowance for slope.

Payment for all work shall be made at a lump sum bid price for all repository preparation work required for the construction season, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to prepare the repositories to receive contaminated materials including establishing work zones, erosion controls (for repository areas), clearing and grubbing, and preparation of the subgrade.

Specific tasks in this bid item include:

a. Establish work zone boundaries and equipment decontamination areas in accordance with Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE;

b. Establish access roads and ingress and egress points as required;

c. Establish temporary erosion controls in accordance with Section 01 57 23 TEMPORARY EROSION CONTROL;

d. Perform clearing and grubbing work in accordance with Section 31 11 00 CLEARING AND GRUBBING;

e. Remove and/or relocate site features in accordance with Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES. The demolition of the house on Parcel L shall be included in BASE BID ITEMS DL - DEMOLISH HOUSE ON PARCEL L.

f. Protect culturally sensitive area at the Swimming Pool Repository in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION.

g. Prepare the subgrade of the repository by scarifying the surface and grading slopes steeper than 3H:1V in accordance with the Contract Drawings and Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIALS.

3.7 ALL WORK TO PREPARE PARCELS (BASE BID ITEMS PP)

Measurement for this lump sum item shall include all items described under this bid item and shown on the Contract Drawing and no separate quantity measurement shall be made.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to complete all site preparation tasks for a parcel prior to the excavation of contaminated material. Specific tasks in this bid item include, but not limited to:

a. Establish work zone boundaries and seal windows and doors of residences within exclusion zone to mitigate potential dust generation indoors in accordance with Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE and Section 01 57 20 ENVIRONMENTAL PROTECTION;

b. Establish temporary erosion controls (for parcels only) in accordance with Section 01 57 23 TEMPORARY EROSION CONTROL;

c. Remove or temporarily relocate site features in accordance with Contract Drawings and Section 02 41 00 DEMOLITION AND RESTORATION OF

SITE FEATURES;

d. Perform clearing and grubbing in accordance with Section 31 11 00 CLEARING AND GRUBBING; Note: Not all vegetation at the site is targeted for removal and E&R Contractor must protect trees in Legacy Tree Protection Areas during clearing and demolition activities. Hauling, reuse, and chipping of vegetation is considered incidental to this item.

e. Remove, stockpile, and recycle/process/dispose of as required concrete driveways, former concrete foundations, walkways, existing manholes, clarifiers at the Parcel WWTP, and other miscellaneous concrete debris in accordance with Contract Drawings and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES;

f. Remove underground sprinkler systems in accordance with Contract Drawings and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES;

g. Temporarily relocate all moveable structures (such as sheds, propane and fuel oil tanks, hot tubs, HVAC units, landscaping materials) as shown on the Contract Drawings;

h. Remove and dispose of decks as indicated on the Contract Drawings; and,

i. Perform utility location and implement appropriate utility protection or removal efforts, as appropriate.

Septic systems are not covered in this work element and they are included in a separate work element (BASE BID ITEMS SI - INSTALL SEPTIC SYSTEM).

3.8 ALL WORK TO DEMOLISH BARN ON PARCEL H (BASE BID ITEMS DH)

Measurement for this lump sum item for the barn structure on Parcel H shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to survey, demolish, segregate, disconnect and cap utilities, and dispose of the barn on Parcel H in accordance with Contract Drawings and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

3.9 ALL WORK TO DEMOLISH HOUSE ON PARCEL L (BASE BID ITEM DL)

Measurement for this lump sum item for the residential structure on Parcel L shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to survey, demolish, segregate, disconnect and cap utilities, and dispose of the house on Parcel L in accordance with Contract Drawings and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

3.10 ALL WORK TO PREPARE THE ODOT BORROW SOURCE (BASE BID ITEM PO)

Measurement for this unit price item shall be made per acre of the ODOT Borrow Source area prepared for excavation as measured by the plan view of the survey after work is completed with no allowance for slope.

Payment for all work shall be made at contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to grubbing, develop access, establish ingress/egress, install temporary erosion controls, and top soil stripping (i.e., top 6 inches) and stockpile in accordance with the Contract Drawings and Section 01 57 23 TEMPORARY EROSION CONTROL, Section 31 11 00 CLEARING AND GRUBBING, and Section 31 23 00 EARTHWORK AND FILL. Site preparation costs for a given portion of the borrow area will be only paid once. Clearing of trees at this borrow source will be completed by others.

3.11 ALL WORK TO PREPARE THE PARCEL H BORROW SOURCE (BASE BID ITEMS PH)

Measurement for this unit price item shall be made per acre of Parcel H Borrow Source area prepared for excavation as measured by the plan view of the survey after work is completed with no allowance for slope.

Payment for all work shall be made at contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to clearing, grubbing, develop access, establish ingress/egress, install temporary erosion controls, and top soil stripping (i.e., top 6 inches) and stockpile in accordance with the Contract Drawings and Section 01 57 23 TEMPORARY EROSION CONTROL, Section 31 11 00 CLEARING AND GRUBBING, and Section 31 23 00 EARTHWORK AND FILL. Site preparation costs for a given portion of the borrow area will be only paid once.

3.12 ALL WORK TO EXCAVATE AND HAUL CONTAMINATED SOIL FROM PARCEL EXCAVATION AREAS TO THE ONSITE REPOSITORY(IES) (BASE BID ITEMS EX)

Measurement for this unit price item shall be made by the bank cubic yard of excavated material computed by the average end area method from surveys taken before and after the excavation operations.

Payment for all work to excavate, load, and haul contaminated material from parcels, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required for excavation of contaminated material to depths as great as 4 feet, hauling to a designated onsite repository(ies), as shown on the Contract Drawings, and in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED SOIL. Site dust control shall be performed in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION and construction surveying for staking, grade, control, and record drawings shall be performed in accordance with Section 01 71 23 CONSTRUCTION SURVEYING. Record survey data shall be collected by the Contractor on each parcel upon completion of contaminated soil removal. This bid item includes effort associated with specialized excavation techniques required in Legacy Tree Protection Areas as well as near building foundations and existing structures/utilities.

3.13 ALL WORK TO PERFORM PERIMETER AIR MONITORING (BASE BID ITEMS AM)

Measurement for this unit price item shall be made by the field day of sampling collection and analysis.

Payment for all work to setup, sample, ship, and analyze perimeter air samples at the site, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required as shown on the Contract Drawings, and in accordance with Section 01 36 20 PERIMETER AIR MONITORING.

3.14 ALL WORK TO PLACE, GRADE, AND COMPACT CONTAMINATED SOIL IN ONSITE REPOSITORY(IES) (BASE BID ITEMS PG)

Measurement for this unit price item shall be made by the bank cubic yard of excavated material computed by the average end area method from surveys taken before and after the excavation operations.

Payment for all work to place, compact, and grade contaminated materials from parcels at a designated onsite repository(ies), shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required for material placement, grading, and compaction at a designated onsite repository, as shown on the Contract Drawings and in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED SOIL. Site dust control shall be performed in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION and construction surveying for staking, grade, control, and record drawings shall be performed in accordance with Section 01 71 23 CONSTRUCTION SURVEYING.

3.15 ALL WORK TO INSTALL MARKER BARRIER USING RUBBLIZED CONCRETE (BASE BID ITEMS MB)

Measurement for this unit price item shall be made by square foot of warning layer installed and measured by the plan view of the survey after installation is completed with no allowance for slope, lap, scrap, anchor trench, or waste. This bid item applies to marker barrier installed for contaminated soil left-in-place at a depth of greater than 4 feet (or at a depth as directed by the RA Construction Manager).

Payment for all work to provide the marker barrier at all locations where contamination is identified at a depth deeper than 4 feet (or at a depth as directed by the RA Construction Manager) shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals to install the marker barrier as shown on the Contract Drawings and in accordance with Section 02 05 10 MARKER BARRIER GEOTEXTILE. This bid item shall include costs for the hauling, placement, and leveling of crushed concrete materials (processing to be paid as a part of BASE BID ITEM PP - PREPARE PARCELS) to be used as a part of the marker barrier. Record survey of the marker barrier location in accordance with Section 01 71 23 CONSTRUCTION SURVEY and Section 01 78 00 CLOSEOUT SUBMITTALS is considered incidental to this item. If quantity of crushed concrete is insufficient to install marker barrier, imported crushed concrete materials may be used for the warning barrier and will be paid under the OPTIONAL BID ITEM RC - IMPORT ADDITIONAL RUBBLIZED CONCRETE FOR MARKER BARRIER, upon approval from the RA Construction Manager. In addition, excess oversize material may also be used and paid under the OPTIONAL BID ITEM EO - PLACE AND GRADE EXCESS OVERSIZE MATERIAL.

3.16 ALL WORK TO PERFORM MANHOLE ABANDONMENT (BASE BID ITEM MA)

Measurement for this lump sum cost per manhole shall include all items

described under this bid item and no separate quantity measurement shall be made.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to complete abandonment of manholes in accordance with the Contract Drawings and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

3.17 ALL WORK TO EXCAVATE, SCREEN, AND STOCKPILE BORROW MATERIAL AT THE GOVERNMENT-FURNISHED BORROW SOURCES (BASE BID ITEMS ES)

Measurement for this unit price item shall be made by the bank cubic yard of excavated material computed by the average end area method from surveys taken before and after the excavation operations at either of the government-furnished borrow areas (ODOT and Parcel H). Initial survey for this basis of measurement is required to be performed after the initial stripping of top soil is performed as described in BASE BID ITEM PO - PREPARE THE ODOT BORROW SOURCE.

Payment for all work to excavate, screen, and load from the borrow area, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required for excavation of borrow source overburden material, screening of overburden material to produce and stockpile unamended growth media (i.e., 2-inch minus), subsoil, oversize material, and boulders (if applicable) in accordance with Section 31 23 00 EARTHWORK AND FILL. Construction surveying for staking, grade, control, and record drawings shall be performed in accordance with Section 01 71 23 CONSTRUCTION SURVEYING.

3.18 ALL WORK TO HAUL SCREENED BORROW MATERIAL FROM THE ODOT BORROW SOURCE (BASE BID ITEMS OB)

Measurement for this unit price item shall be made by the placed cubic yard of material computed by the average end area method from surveys taken before and after the excavation operations at the borrow area.

Payment for all work to haul screened borrow source material (i.e., growth media, subsoil, oversize material, and boulders) from the ODOT borrow area, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required for hauling screened borrow material for backfill and restoration operations, as shown on the Contract Drawings and in accordance with Section 31 23 00 EARTHWORK AND FILL and Section 32 92 19 GROWTH MEDIA AND SEED. Excess oversize material generated will not be paid under this bid item.

3.19 ALL WORK TO HAUL SCREENED BORROW MATERIAL FROM THE PARCEL H BORROW SOURCE (BASE BID ITEMS HB)

Measurement for this unit price item shall be made by the placed cubic yard of material computed by the average end area method from surveys taken before and after the excavation operations at the borrow area.

Payment for all work to haul screened borrow source material (i.e., growth media, subsoil, oversize material, and boulders) from the Parcel H borrow area, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and

incidentals required for hauling screened borrow material for backfill and restoration operations, as shown on the Contract Drawings and in accordance with Section 31 23 00 EARTHWORK AND FILL and Section 32 92 19 GROWTH MEDIA AND SEED. Excess oversize material generated will not be paid under this bid item.

3.20 ALL WORK TO PLACE, GRADE, AND COMPACT SUBSOILS AT PARCELS (BASE BID ITEMS FP)

Measurement for this unit price item shall be made by the placed and compacted cubic yard of subsoil computed by the average end area method from surveys taken before and after placement operations.

Payment for all work to place, grade, and compact subsoil material at the parcels, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required for material placement, grading, and compaction as shown on the Contract Drawings and in accordance with Section 31 23 00 EARTHWORK AND FILL. This item excludes the placement and grading of growth media materials which are addressed under BASE BID ITEMS GM - AMEND, PLACE, AND GRADE GROWTH MEDIA.

Site dust control shall be performed in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION and construction surveying for staking, grade, control, and record drawings shall be performed in accordance with Section 01 71 23 CONSTRUCTION SURVEYING. Compaction testing in accordance with Section 31 23 00 EARTHWORK AND FILL is a part of this work element.

3.21 ALL WORK TO AMEND, PLACE, AND GRADE GROWTH MEDIA (BASE BID ITEMS GM)

Measurement for this unit price item shall be made by the placed cubic yard of growth media computed by the average end area method from surveys taken before and after the growth media material placement operations at the parcels.

Payment for all work to prepare, supply, and deliver amendments, blend, place, and grade borrow materials for growth media material at the parcels, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required for amendment and placement of growth media, as shown on the Contract Drawings and in accordance with Section 31 23 00 EARTHWORK AND FILL and Section 32 92 19 GROWTH MEDIA AND SEED.

Site dust control shall be performed in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION and construction surveying for staking, grade, control, and record drawings shall be performed in accordance with Section 01 71 23 CONSTRUCTION SURVEYING.

3.22 ALL WORK TO PLACE AND GRADE OVERSIZED MATERIAL (BASE BID ITEMS OS)

Measurement for this unit price item shall be made by the placed cubic yard of oversized material computed by the average end area method from surveys taken before and after the oversized material placement operations at the parcels.

Payment for all work to place and grade borrow materials for oversized material at the parcels, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required for placement of oversized

material, as shown on the Contract Drawings and in accordance with Section 31 23 00 EARTHWORK AND FILL.

Site dust control shall be performed in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION and construction surveying for staking, grade, control, and record drawings shall be performed in accordance with Section 01 71 23 CONSTRUCTION SURVEYING.

If excess oversized material is available at the borrow source areas, it may be used as marker barrier substitute material, embankment stabilization, or for other applications as approved by the RA Construction Manager. Excess oversize material (not indicated on Contract Drawings) shall be paid under OPTIONAL BID ITEM EO - PLACE AND GRADE EXCESS OVERSIZE MATERIAL.

3.23 ALL WORK TO INSTALL SEPTIC SYSTEM (BASE BID ITEMS SI)

Measurement for this lump sum item shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to remove, dispose, design, supply, install, and test septic system in accordance with the Contract Drawings, Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES, and Section 31 23 00 EARTHWORK AND FILL. Record survey of all installed septic system features is included in this bid item. This item includes temporary service support for resident septic systems disconnected during remedial activities at parcels whose residents remain in their homes during remediation.

3.24 ALL WORK TO INSTALL CULVERTS ROAD CROSSINGS (BASE BID ITEM CI)

Measurement for this unit price item shall be made by linear foot of piping installed and in place as measured by the plan view of the survey after installation is completed with no allowance for slope, lap, scrap, or waste.

Payment for all work to provide the permanent storm water conveyance piping at road crossings for non-parcel work (culverts on parcels are incidental to Parcel Restoration) shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals to install the piping, fittings, and all appurtenances required to install the permanent storm water conveyance piping and culverts as shown on the Contract Drawings and in accordance with Section 33 42 00 CULVERTS. Surface repair of asphalt is considered incidental to this item.

3.25 ALL WORK TO INSTALL MANHOLES AND STORM WATER CONCRETE PIPE (BASE BID ITEM SW)

Measurement for this lump sum cost shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to supply, install, and restore storm water channels, piping, and manholes not associated with road crossings in accordance with Contract Drawings and Section 02 41 00 DEMOLITION AND

RESTORATION OF SITE FEATURES, Section 03 30 00 CAST-IN-PLACE CONCRETE, Section 03 40 00 PRECAST CONCRETE.

3.26 ALL WORK TO RESTORE PARCELS (BASE BID ITEMS PR)

Measurement for this lump sum item shall include all items described under this bid item and shown on the Contract Drawings, and no separate quantity measurement shall be made.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to complete all restoration tasks for a parcel after backfill activities are complete. Specific tasks in this bid item include, but not limited to:

a. Remove work zone fencing and materials for sealing windows and doors of residences in accordance with Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE and Section 01 57 20 ENVIRONMENTAL PROTECTION.

b. Remove temporary erosion controls in accordance with Section 01 57 23 TEMPORARY EROSION CONTROL once vegetation has been established.

c. Replace and/or return site features in accordance with Contract Drawings and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

d. Replace driveways, walkways, and other miscellaneous asphalt and concrete site features in accordance with Contract Drawings and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES, Section 03 30 00 CAST-IN-PLACE CONCRETE, and Section 32 12 17 HOT MIXED ASPHALT CONCRETE (ASPHALT). Storm water controls, such as culverts under driveways are to be replaced in accordance with Section 33 42 00 CULVERTS.

e. Replace underground sprinkler systems in accordance with Contract Drawings and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

f. Return and re-install existing site features (such as sheds, propane and oil tanks, hot tubs, landscaping materials, and HVAC units) that were relocated, restoring them to original functioning service.

g. Install the geomembrane material under decks as shown on the Contract Drawings and in accordance with Section 02 05 20 WASTE CONTAINMENT GEOMEMBRANE. Activities required for access to the placement location, hand-leveling, surface preparation prior to placement, and anchor trenches required are considered incidental to this item.

h. Replace decks as indicated on the Contract Drawings.

i. Complete post excavation washing of hard surfaces.

j. Re-establish vegetation (including erosion control blanket, fertilizing, mulching, seeding, and watering, as required) as shown on the Contract Drawings and Section 32 92 19 GROWTH MEDIA AND SEED.

Septic systems are not covered in this work element and they are included in a separate work element (BASE BID ITEMS SI - INSTALL SEPTIC SYSTEM).

3.27 ALL WORK TO INSTALL A TEMPORARY 6-INCH SOIL COVER ON REPOSITORY(IES) (BASE BID ITEMS TC)

Measurement for this unit price item shall be made by the placed cubic yard of subsoil material computed by the average end area method from surveys taken before and after the placement operations.

Payment for all work shall be made at a unit price bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to place and grade a 6-inch thick temporary cover in accordance with the Contract Drawings and in accordance with and Section 31 23 00 EARTHWORK AND FILL.

Site dust control shall be performed in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION and construction surveying for staking, grade, control, and record drawings shall be performed in accordance with Section 01 71 23 CONSTRUCTION SURVEYING.

3.28 ALL WORK TO INSTALL A PERMANENT 24-INCH SOIL COVER ON REPOSITORY(IES) (BASE BID ITEMS PC)

Measurement for this unit price item shall be made by the placed cubic yard of subsoil and growth media material computed by the average end area method from surveys taken before and after the placement operations.

Payment for all work shall be made at a unit price bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to prepare subbase, install geotextile fabric in accordance with 02 05 10 MARKER BARRIER GEOTEXTILE, install and compact a permanent 24-inch soil cover (i.e., 18 inches of subsoil and 6 inches of growth media) on a repository in accordance with the Contract Drawings and in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL, Section 31 23 00 EARTHWORK AND FILL, and SECTION 32 92 19 GROWTH MEDIA AND SEED.

Site dust control shall be performed in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION and construction surveying for staking, grade, control, and record drawings shall be performed in accordance with Section 01 71 23 CONSTRUCTION SURVEYING.

3.29 ALL WORK TO RESTORE AND SEED PERMANENT REPOSITORY(IES) (BASE BID ITEMS RR)

Measurement for this unit price item shall be made per acre of repository area restored and seeded as measured by the plan view of the survey after work is completed with no allowance for slope.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to restore the repositories after installation of the permanent soil cover.

Specific tasks in this bid item include:

a. Remove work zone boundaries in accordance with Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE;

b. Remove temporary erosion controls in accordance with Section 01 57 23 TEMPORARY EROSION CONTROL once vegetation has been established;

c. Re-establish vegetation (including erosion control blanket, fertilizing, mulching, seeding, and watering (as required) as shown on the Contract Drawings and Section 32 92 19 GROWTH MEDIA AND SEED.

d. Install permanent access road at swimming pool repository as shown on the Contract Drawings and in accordance with 31 23 00 EARTHWORK AND FILL.

e. Install access prevention boulders as shown on the Contract Drawings in accordance with 31 23 00 EARTHWORK AND FILL.

f. Install culverts as shown on the Contract Drawings and in accordance with Section 33 42 00 CULVERTS

3.30 ALL WORK TO RESTORE AND SEED PARCEL H BORROW SOURCE (BASE BID ITEM HR)

Measurement for this unit price item shall be made per acre of Parcel H borrow source area restored and seeded as measured by the plan view of the survey after work is completed with no allowance for slope.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to restore the Parcel H borrow source area in accordance with Contract Drawings, Section 31 23 00 EARTHWORK AND FILL, and Section 32 92 19 GROWTH MEDIA AND SEED.

3.31 ALL WORK TO DEMOBILIZE EQUIPMENT AND PERSONNEL (BASE BID ITEMS DM)

Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

Payment for all work to demobilize from site shall be made at the lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to decontaminate and demobilize personnel and equipment from the site. Payment for this item shall be made for each construction season. Mobilization of personnel and equipment shall be included in BASE BID ITEMS MO - MOBILIZE EQUIPMENT AND PERSONNEL ONSITE.

3.32 ALL COSTS TO DEVELOP AND SUBMIT ANNUAL CLOSE-OUT REPORTS AND RECORD DRAWINGS (BASE BID ITEM CO)

Measurement for this lump sum item shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all costs for closeout submittals requirements shall be made at the lump sum bid price which shall include as-built drawings, documentation, and operations and maintenance manuals in accordance with Section 01 78 00 CLOSEOUT SUBMITTALS under the terms of the contract.

3.33 ALL WORK TO IMPORT ADDITIONAL RUBBLIZED CONCRETE FOR MARKER BARRIER (OPTIONAL BID ITEM RC)

Measurement for this unit price item shall be made by the ton of delivered material as indicated on a certified weight ticket during transportation to the Site.

Payment for all work to procure, supply, haul, and deliver E&R Contractor

furnished materials - Rubblized Concrete - for site operations, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required for supply, hauling, and delivery at the parcels, as shown on the Contract Drawings and in accordance with Section 31 23 00 EARTHWORK AND FILL.

3.34 ALL WORK TO PLACE AND GRADE OVERSIZE MATERIAL (OPTIONAL BID ITEMS EO)

Measurement for this unit price item shall be made by the placed cubic yard of excess oversized material computed by the average end area method from surveys taken before and after the oversize material placement operations.

Payment for all work to place and grade borrow materials for oversized material at the parcels, shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required for placement of oversized material as marker barrier substitute material, embankment stabilization, or for other applications as approved by the RA Construction Manager and in accordance with Section 31 23 00 EARTHWORK AND FILL.

Site dust control shall be performed in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION and construction surveying for staking, grade, control, and record drawings shall be performed in accordance with Section 01 71 23 CONSTRUCTION SURVEYING.

3.35 ALL WORK TO REMOVE AND DISPOSE OF ASBESTOS-WRAPPED STEAM PIPE (OPTIONAL BID ITEM AP)

Measurement for this unit price item shall be made by linear foot of piping removed and disposed as measured by the plan view of the survey after removal is completed.

Payment for all work to remove and dispose of asbestos-wrapped steam pipe found during soil excavation operations shall be made at the contract unit price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals to remove, characterize, prepare, haul, and dispose of the piping and associated contents and wrap in accordance with Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

3.36 ALL WORK TO PROVIDE FOUNDATION ASSESSMENT(S) (OPTIONAL BID ITEM FA)

Measurement for this unit cost per parcel where excavation exceeds an excavation depth of two feet adjacent to an existing residential building shall include all items described under this bid item and no separate quantity measurement shall be made.

Payment for all work shall be made at a lump sum bid price, for which price and payment shall be full compensation for all labor, equipment, material, and incidentals required to perform a structural engineering survey in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIALS. Work shall include, but not limited to, evaluation of the existing structure, review of the scope of the excavation, and providing written recommendations by a licensed and qualified engineer to mitigate damage to the structure.

-- End of Section --

SECTION 01 32 01

PROJECT SCHEDULE

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the preparation of a baseline project schedule and periodic update of the project schedule for review at the pre-construction meeting and subsequent weekly progress meetings during the construction season.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Schedule; G

Submit no later than 30 calendar days after receipt of Notice to Proceed.

SD-03 Product Data

Periodic Schedule Updates; G

1.3 CONSTRUCTION PROJECT SCHEDULE

The E&R Contractor's construction project schedule shall show the complete sequence of work by activity.

Show the dates for the beginning and completion for each major operation or segment of work. This list shall be in general accordance with Paragraph GENERAL REQUIREMENTS.

Estimated accumulated percentage of completion of each item and estimated total percentage of work completed as of the last day of each month shall be noted at appropriate points on the chart.

1.3.1 Project Schedule

The schedule shall provide a reasonable sequence of activities, which represent work through the entire project, and shall be at a reasonable level of detail (i.e., on a parcel-specific level). The RA Construction Manager will return the project schedule after review to the E&R Contractor with comments. Deficiencies in the project schedule will be discussed at the pre-construction meeting. Make all necessary amendments required by the RA Construction Manager and resubmit it for approval. This procedure shall continue until the RA Construction Manager gives final written approval. Make necessary effort so that only one resubmittal is required.

Onsite work shall not begin until the project schedule has been approved

and accepted by the RA Construction Manager.

1.3.2 Periodic Schedule Updates

Submit schedule updates on a weekly basis and with application for payment on a monthly basis. These submissions shall enable the RA Construction Manager to assess progress. If the E&R Contractor fails or refuses to furnish the information and project schedule data, which in the judgment of the RA Construction Manager is necessary for verifying the E&R Contractor's progress, the E&R Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

1.4 FORM OF SCHEDULES

Prepare a schedule(s) in the form of a bar chart with the following details:

a. Identify the project at the top of the project schedule.

b. Provide a separate horizontal bar for each work activity or operation.

c. Provide bold vertical lines, at 1-week intervals, with consecutive numbering of each week on the horizontal time scale.

d. Identify the first work day of each work item on the horizontal time scale.

e. The chronological order of the start of each major operation or segment of work will determine the vertical location of its bar on the chart.

1.5 PROGRESS REVISIONS

Indicate progress of each activity to date of submission.

Show changes occurring since previous submission of schedule with the following details:

a. Show major changes in scope or quantities (if any).

b. Show activities modified since previous submission.

c. Show revised projections of progress and completion.

d. Show other identifiable changes.

Provide a narrative report as needed to define:

a. Problem areas, anticipated delays, and the impact on schedule.

b. Recommended corrective action and its effect.

c. The effect of changes, if any, on schedules of subcontractors.

1.6 QUALIFICATIONS

Designate an authorized representative who shall be responsible for the preparation of all required project schedule reports.

PART 2 PRODUCTS

2.1 Schedule Software

Prepare and update the project schedule using a computer software system that produces legible, easily updated critical path schedules.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Show the dates for the beginning and completion for each major operation or segment of work - for each construction season. This list must include, but is not limited to:

a. Pre-construction activities and review of pre-construction submittals.

b. Mobilization.

c. Site preparation that includes installation of temporary facilities and controls, delineation of work zones and repository areas, and utility location.

d. Clearing of trees from within OU1 (seasonally per construction sequence) and government-furnished borrow areas.

e. Excavation of borrow material at borrow locations and stockpiling/processing of material for use during each construction season.

f. Demolition/disposal of site features and debris at each parcel.

g. Contaminated soil excavation activities at each parcel.

h. Consolidation of contaminated material within the Memorial Park and Swimming Pool repositories.

i. Post-excavation washing of hard surfaces.

j. Installation of the frost protective cap and restoration of site features.

k. Installation of temporary soil cover and temporary asbestos warning signage at each active (incomplete) repository between construction seasons.

l. Installation of permanent frost protective cap at each inactive (completed) repository.

m. Demobilization.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

This work item includes the requirements for compiling, processing, and transmitting submittals required for execution of the project. Submittals are categorized into two types: Government-approval submittals and Informational submittals. Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The RA Construction Manager shall coordinate the Government's review.

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Payment Application Format
Submittal Register; G

1.3 SUBMITTAL DESCRIPTIONS (SD)

Submittal requirements are identified in the technical specification sections. Submittals are identified by SD numbers and titles. The following present SD numbers and titles and examples of submittals under each category.

SD-01 Preconstruction Submittals

Preconstruction submittals may include, but are not limited to:

a. Certificates of insurance
b. Surety bonds
c. List of proposed subcontractors
d. List of proposed products
e. Project schedule
f. Submittal register
g. Other site planning documents

SD-02 Shop Drawings

Shop drawings as defined in the General Conditions, and as specified in individual sections, include, but are not necessarily limited to, custom prepared data such as fabrication and erection/installation (working) drawings, scheduled information, actual shop work manufacturing instructions, coordination drawings, and equipment inspection and test reports, including certifications, as applicable to the work.

Contactor shall verify all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data and coordinate each item with other related shop drawings and the contract

requirements.

All details on shop drawings shall show clearly the relation of the various parts to the main structures (e.g., ladder assembly in a precast concrete manhole, pumps in septic system treatment unit), and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted.

All shop drawings submitted by subcontractors and vendors shall be reviewed by the E&R Contractor for field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data and that they have been coordinated with other related shop drawings and the contract requirements. Submittals provided directly from subcontractors or vendors will not be accepted by the RA Construction Manager.

The E&R Contractor shall be responsible for the accuracy of the subcontractor's or vendor's submittal and, for their submission in a timely manner to support the requirements of the E&R Contractor's construction schedule. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractor or vendor to correct before submission to the RA Construction Manager. All shop drawings shall be approved by the E&R Contractor.

Construction delays due to the untimely submission of submittals will constitute inexcusable delays for which E&R Contactor shall not be eligible for additional cost nor additional contract time. Inexcusable delays consist of any delay within the E&R Contactor's control.

SD-03 Product Data

Product data, as specified in individual Specification Sections, include, but are not limited to the manufacturer's standard prepared data for manufactured products (catalog data) such as the product specifications, installation instructions, product photographs (or diagrams), quality control inspection and reports, certifications of compliance (as specified or otherwise required), product operating and maintenance instructions, and recommended spare parts and product warranties, as applicable.

SD-05 Design Data

Design calculations and analyses or other data pertaining to a part of work.

SD-06 Test Reports

Provide copies of all test records and reports as specified in the various technical specifications.

SD-07 Certificates

Provide statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system, or material meets specification requirements. Must be dated after award of project contract and clearly name the project. Test reports that document compliance with specification requirements may also be included as attachments to the certificate.

Document required of E&R Contractor, or of a manufacturer, supplier,

installer or subcontractor through E&R Contractor, to document procedures, acceptability of methods, or personnel qualifications. Provide evidence of qualification, certification, or registration as required in the Contract Documents to verify qualifications of licensed land surveyor, professional engineer, materials testing laboratory, specialty subcontractor, technical specialist, consultant, specialty installer, and other professionals.

Provide text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material shall be submitted describing installation of a product, system, or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-11 Closeout Submittals

Submit contract documentation as indicated in Section 01 78 00 Closeout Submittals.

No later than Substantial Completion of each construction season, submit a record of all changes during construction not already incorporated into Contract Drawings.

1.4 GENERAL SUBMITTAL REQUIREMENTS

All submittals shall be clearly identified as follows:

a. Date of submission

b. Project number

c. Project name

d. Contractor identification

    1. Contractor

    2. Supplier

    3. Manufacturer

    4. Manufacturer or supplier representative

e. Identification of the product

f. Reference to Contract drawing(s)

g. Reference to specification section number, page, and paragraph(s)

h. Reference to applicable standards, such as American Society for Testing and Materials (ASTM) or Federal Standards numbers

i. Indication of Contractor's approval

j. Contractor's certification statement

k. Identification of deviations from the Contract Documents, if any

l. Reference to previous submittal (for resubmittals)

Submittals shall be clear and legible and of sufficient size for legibility and clarity of the presented data.

1.5 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

If specifically required in any of the technical Specification Sections, submit a Professional Engineer (P.E.) Certification for each item required, using the form appended to this Section, signed and sealed by the P.E. licensed or registered in the state wherein the work is located.

1.6 CONTRACTOR'S CERTIFICATION

Each submittal shall have affixed to it the following Certification Statement:

> "Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all contract requirements."

Shop drawings, working drawings, and product data sheets 11 x 17 inches and smaller shall be combined electronically in an orderly fashion and bear the above Certification Statement on the cover sheet. The electronic transmittal cover sheet for each identified shop drawing shall fully describe the packaged data and include a listing of all items within the package.

The review and approval of submittals by the RA Construction Manager shall not relieve the E&R Contractor from the responsibility for the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the E&R Contractor and the RA Construction Manager will have no responsibility therefor.

Project work, materials, fabrication, and installation shall conform to approved shop drawings (including working drawings and product data) and applicable samples.

No portion of the work shall be started, nor shall any materials be fabricated or installed before approval of such item. Procurement, fabrication, delivery or installation, or products or materials that do not conform to approved submittals shall be at the E&R Contractor's risk. Furthermore, such work products delivered, installed, or performed without approved submittals, will not be eligible for progress payment until such time as the submittal is approved or brought into compliance with contract documents. The RA Construction Manager will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

1.7 OTHER REQUIREMENTS OF THE TECHNICAL SPECIFICATION SECTIONS

Comply with all other requirements of the technical specifications.

1.8 PAYMENT APPLICATION FORMAT

If an application form is included in the Contract Documents, use that form unless otherwise approved by the RA Construction Manager. If an application form is not included in the Contract Documents, E&R Contractor

may propose a form for approval.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 SUBMITTAL COORDINATION MEETING

Before any submittals are sent to the RA Construction Manager, the E&R Contractor shall meet with the RA Construction Manager and the Government to further develop an approved submittal register for the basic contract submittal items. A preliminary submittal register listing the basic contract submittal items is attached to the end of this section. During the meeting all required items will be identified and grouped into one of the categories defined in paragraph "Submittal Categories." The final submittal register shall be coordinated with the progress schedule and submitted within 21 days of the contract Notice to Proceed.

3.2 SUBMITTAL REGISTER

The preliminary submittal register (See Attachment 1) shall be further developed by the E&R Contractor prior to the submittal coordination meeting and list each item of equipment and material for which submittals are required in the Technical Specifications. The E&R Contractor shall approve all items listed on the submittal register. When the final submittal register is submitted for approval, the E&R Contractor shall complete the column entitled "Item No." and all data under "Contractor Schedule Dates" and return an electronic copy to the RA Construction Manager for approval. The E&R Contractor shall review the list to ensure its completeness and may expand general category listings to show individual entries for each item. The numbers in column "Item No." are to be assigned sequentially starting with "1" for each specification section. DO NOT pre-assign transmittal numbers when preparing the submittal register. When a conflict exists between the submittal register and a submittal requirement in the technical sections, the approved submittal register shall govern. The preliminary, and then the final approved submittal register, will become the scheduling documents and will be updated monthly and used to control submittals throughout the life of the contract.

Names and titles of individuals authorized by the E&R Contractor to approve shop drawings shall be submitted to RA Construction Manager. Supplier or subcontractors certifications are not acceptable as meeting this requirement.

The submittal register shall include the following items (as applicable):

a. Description

b. Submittal number: Utilize a 12 character submittal identification numbering system in the following manner:

    1. The first five characters shall be the submittal description (i.e. SD-XX) represents the submittal description type as described in this Section.

    2. The next five digits shall be the applicable Section Number.

3. The next two digits shall be the numbers 01 to 99 to sequentially number each separate item or drawing submitted under each specific Specification Section, in the order submitted.

4. The last character shall be a letter, A to Z, indicating the submission (or resubmission) of the same submittal, i.e., "A" = 1st submission, "B" = 2nd submission, "C" = 3rd submission, etc. A typical submittal number would be as follows:

   SD-01 015720 01 B

   SD-01 = SD-01 (Preconstruction Submittals)
   015720 = Section for Environmental Protection Plan
   01 = the first submittal under this section
   B = the second submission (first resubmission) of that particular preconstruction submittal.

c. Date transmitted to the RA Construction Manager

d. Date returned to Contractor (from RA Construction Manager)

e. Status of Submittal (Approved/Not Approved/etc.)

f. Date of Resubmittal to RA Construction Manager and Return from RA Construction Manager (if applicable and repeat as necessary)

g. Date material released for fabrication

h. Projected (or actual) delivery date

3.3 ELECTRONIC TRANSMITTALS

The RA Construction Manager will employ an electronic document filing and tracking system for the management of submittals and other project communications. Software and training for the use of this system will be provided by others. The E&R Contractor shall make staff available for training and use the document filing and tracking system during the project.

Electronic submittal shall be transmitted provided the following conditions are met:

a. The transmittal form is included.

b. All other requirements specified above have been met, including, but not limited to, coordination by the E&R Contractor, review and approval by the E&R Contactor, and the E&R Contractor's Certification.

c. The submittal contains no pages or sheets larger than 11 x 17 inches.

d. With the exception of the transmittal sheet, the entire submittal is included in a single file.

e. The electronic files are PDF format (with printing enabled).

f. The RA Construction Manager's review time will commence upon receipt of the electronic copy of the submittal.

g. For Submittals that require certification, corporate seal, or professional embossment (i.e., P.Es, Surveyors, etc.) transmit at least two hard-copy originals to the RA Construction Manager. In addition, provide additional photocopied or scanned copies, as specified above, showing the required certification, corporate seal, or professional seal.

3.4 SUBMITTAL PROCEDURES

3.4.1 Government-Approval Submittals

Government-approval submittals shall provide a minimum of 7 days for RA Construction Manager review. An additional 21 days shall be allowed for Government review and approval following RA Construction Manager review. Resubmittals will be subject to the same review time.

Government-approval submittals shall be submitted sufficiently in advance of construction requirements to allow for possible need of re-submittals, including the specified review time for the RA Construction Manager and Government.

3.4.1.1 E&R Contractor's Responsibilities

Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work of other related Sections, so that the installation will not be delayed by processing times, including disapproval and resubmittal (if required). Coordinate with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. Extensions to the Contract Time will not be approved for the E&R Contractor's failure to transmit submittals sufficiently in advance of the work.

An expedited review period may be requested by the E&R Contractor but must be approved by the RA Construction Manager.

If the E&R Contractor considers any correction indicated on the submittal to constitute a change to the Contract Documents, provide written notice thereof to the RA Construction Manager immediately, and do not perform work indicated on the submittal before such notice has been received and approved by the RA Construction Manager.

When the submittal has been completed to the satisfaction of the RA Construction Manager, carry out the construction in accordance therewith, and make no further changes therein except upon written instructions from the RA Construction Manager.

3.4.1.2 RA Construction Manager's Responsibilities

The RA Construction Manager will not review submittals that do not include the E&R Contractor's approval stamp. Such submittals will be returned to the E&R Contractor, without action, for correction.

Partial submittals will not be reviewed. If, in the opinion of the RA Construction Manager, a submittal is incomplete, that submittal will be returned to the E&R Contractor for completion. Such submittals may be returned with comments from RA Construction Manager indicating the deficiencies requiring correction.

If submittals meet the submittal requirements, RA Construction Manager will forward copies to appropriate reviewer(s). Noncompliant submittals will be returned to the E&R Contractor without action - with the RA Construction Manager retaining one copy.

Submittals that are transmitted in accordance with the specified requirements will be reviewed by the RA Construction Manager within the time specified herein. The time for review will commence upon receipt of submittal by RA Construction Manager and the Government, respectively.

3.4.2 Informational Submittals

Informational submittals shall be provided to the RA Construction Manager a minimum of 7 days prior to commencing field work or delivery to ensure compliance with Contract requirements.

3.4.2.1 E&R Contractor's Responsibilities

Submittals shall be transmitted electronically, unless otherwise indicated in individual specification sections.

Refer to individual Technical Specification sections for specific submittal requirements.

3.4.2.2 RA Construction Manager's Responsibilities

If the informational submittal complies with the Contract requirements, RA Construction Manager will place a copy of the submittal in the project file. RA Construction Manager may elect not to respond to E&R Contractor regarding informational submittals meeting the Contract requirements.

If an informational submittal does not comply with the Contract requirements, RA Construction Manager will respond accordingly to the Contractor within 7 days of confirmed receipt of electronic document. Thereafter, the E&R Contractor shall perform the required corrective action, including retesting, if needed, until the submittal, in the opinion of the RA Construction Manager, is in conformance with the Contract Documents.

3.5 SUBMITTAL REVIEW PROCEDURES

The review of submittals will be for general conformance with the design concept and Contract Documents. They shall not be construed:

a. as permitting any departure from the Contract requirements

b. as relieving the E&R Contractor of responsibility for any errors, including details, dimensions, and materials

c. as approving departures from details furnished by the RA Construction Manager, except as otherwise provided herein

The E&R Contractor remains responsible for details and accuracy, coordinating the work with all other associated work and trades, selecting fabrication processes, techniques of construction, and performing work in a safe manner.

If the submittals describe variations and indicate a deviation from the Contract requirements that, in the opinion of the RA Construction Manager,

are so minor as not to involve a change in Contract Price or Contract Time, the RA Construction Manager may return the reviewed drawings without noting an exception.

Only the RA Construction Manager will utilize the color "RED" in marking submittals.

Submittals will be returned to the E&R Contractor with one of the following codes.

Code 1 - "APPROVED" - This code is assigned when there are no notations or comments on the submittal. When returned under this code, the E&R Contractor may proceed with work element.

Code 2 - "APPROVED AS NOTED" - This code is assigned when a confirmation of the notations and comments IS NOT required by the E&R Contractor. The E&R Contractor may proceed with work element; however, all notations and comments must be incorporated into the final product.

Code 3 - "APPROVED AS NOTED/CONFIRM" - This combination of codes is assigned when a confirmation of the notations and comments is required by the E&R Contractor. The E&R Contractor may proceed with work element; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the RA Construction within 15 calendar days of the date of the RA Construction Manager's transmittal requiring the confirmation.

Code 4 - "APPROVED AS NOTED/RESUBMIT" - This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the entire package. This resubmittal is to address all comments, omissions, and non-conforming items that were noted. Resubmittal is to be received by the RA Construction Manager within 30 calendar days of the date of the RA Construction Manager's transmittal requiring the resubmittal.

Code 5 - "NOT APPROVED" - This code is assigned when the submittal does not meet the intent of the contract documents. The E&R Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the Contract Documents.

Code 6 - "COMMENTS ATTACHED" - This code is assigned where there are comments attached to the returned submittal, which provide additional data to aid the E&R Contractor.

Code 7 - "RECEIPT ACKNOWLEDGED (Not subject to RA Construction Manager's Review or Approval)" - This code is assigned to acknowledge receipt of a submittal that is being filed for informational purposes only. Codes 1 through 5 designate the status of the reviewed submittal with Code 6 showing there has been an attachment of additional data.

Submittals will be reviewed no more than twice at the RA Construction Manager's expense. All subsequent reviews will be performed at the E&R Contractor's expense. Reimburse the RA Construction Manager for all costs invoiced by RA Construction Manager for the third and subsequent reviews.

3.6 VARIANCES

Notify the RA Construction Manager in writing, at the time of the transmittal, any deviations in the submittals from the requirements of the Contract Documents.

Notify the RA Construction Manager in writing, at the time of re-submittal (resubmission), of all deviations from previous submittal submissions except those deviations that are the specific result of prior comments from the RA Construction Manager.

-- End of Section --

Attachment 1 - Preliminary Submittal Register

TITLE:	North Ridge Estates Superfund Site
JOB NAME:	Operable Unit 1 Remedial Action
LOCATION:	Klamath County, Oregon
CONTRACT NO:	
CONTRACTOR:	

SUBMITTAL REGISTER

									CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
	(a)	(b)	(c)	(d)			(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
Line	Activity #	Trans-mittal #	Specification Section	SD #	Submittal Description	Item Submitted	Paragraph #	Classification: GOVT Revwr	Submit	Approval Needed By	Material Needed By	Action Code	Date Of Action	Date FWD to APPR / Auth Date RCD From CONTR	Date FWD To Other Revwr	Date RCD From Other Revwr	Action Code	Date Of Action	Mailed To CONTR/ Date RCD From APPR Authority	Remarks
			01 32 01	01	Preconstruction Submittals	Project Schedule	1.3.1	G												
			01 32 01	03	Product Data	Periodic Schedule Updates	1.3.2	G												
1			01 33 00	01	Preconstruction Submittals	Payment Application Format	1.8													
2			01 33 00	01	Preconstruction Submittals	Submittal Register	3.2	G												
3			01 35 12	07	Certificates	Magnesium Chloride Acceptance														
4			01 35 29	01	Preconstruction Submittals	Site Safety and Health Plan (SSHP)	1.5	G												
5			01 35 29	03	Product Data	Site Control Log	1.12.2													
6			01 35 29	05	Design Data	Work Zones	1.12.1	G												
7			01 35 29	05	Design Data	Decontamination Facilities	1.14.1	G												
8			01 35 29	07	Certificates	Employee Certificates	1.9.4													
9			01 36 20	01	Preconstruction Submittals	Perimeter Air Monitoring Plan (PAMP)		G												
10			01 36 20	06	Test Reports	Air Monitoring Status Reports														
11			01 45 00	01	Preconstruction Submittals	Contractor Quality Control Plan	3.2	G												
12			01 45 10	01	Preconstruction Submittals	Sampling and Analysis Plan	1.4	G												
13			01 45 10	06	Test Reports	Analytical Data Package	3.2	G												
14			01 45 10	06	Test Reports	Data Validation Report		G												
15			01 45 10	07	Certificates	Project Chemist Qualifications														
16			01 45 10	07	Certificates	Environmental Sampler Qualifications														
17			01 45 10	07	Certificates	Laboratory Certification														
18			01 50 00	01	Preconstruction Submittals	Construction Site Plan	1.4	G												
19			01 50 00	01	Preconstruction Submittals	Traffic Control Plan	1.5	G												
20			01 57 20	01	Preconstruction Submittals	Environmental Protection Plan	1.7	G												
21			01 57 20	01	Preconstruction Submittals	Diesel Emission Control Technology Implementation Plan		G												
22			01 57 20	05	Design Data	Green Remediation Tracking Report														
23			01 57 23	05	Design Data	Erosion and Sediment Controls	1.4													
24			01 58 13	03	Product Data	Temporary Repository Signage	2.1													
25			01 71 23	03	Product Data	Surveyor Qualifications	1.5													
26			01 71 23	03	Product Data	Surveyor Field Notes	1.6													
27																				
28																				

TITLE:	North Ridge Estates Superfund Site
JOB NAME:	Operable Unit 1 Remedial Action
LOCATION:	Klamath County, Oregon
CONTRACT NO:	
CONTRACTOR:	

SUBMITTAL REGISTER

									CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
	(a)	(b)	(c)	(d)			(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
			01 71 23	05	Design Data	Quantity Survey	3.3	G												
			01 78 00	11	Closeout Submittals	As-Built Drawings	1.3.1	G												
29			01 78 00	11	Closeout Submittals	Seasonal Closure Reports	1.4	G												
30			02 05 10	03	Product Data	High Visibility Orange (HVO) Geotextile	2.1.1													
31			02 05 10	06	Test Reports	Manufacturing Quality Control Sampling and Testing	2.2													
32			02 05 20	03	Product Data	Field Seams	3.3													
33			02 05 20	03	Product Data	Geomembrane	2.1													
34			02 05 20	06	Test Reports	Manufacturing Quality Control Sampling and Testing	2.2													
35			02 41 00	01	Preconstruction Submittals	General Demolition Plan (and Asbestos-Containing Material Survey)	1.5	G												
36			02 41 00	01	Preconstruction Submittals	Septic System Installation Plans	3.4.2	G												
37			02 41 00	02	Shop Drawings	Septic System	3.4.2	G												
38			02 41 00	02	Shop Drawings	Replacement Deck Design		G												
39			02 41 00	03	Product Data	Septic System Installer Qualifications														
40			02 41 00	05	Design Data	Existing Conditions Survey of Features to be Protected		G												
41			02 41 00	07	Certificates	Certificate of Satisfactory Completion	3.4.2													
42			02 41 00	07	Certificates	AHERA Certified Asbestos Inspector	1.5													
43			02 61 13	01	Preconstruction Submittals	Excavation Work Plan	1.4	G												
44			02 61 13	05	Design Data	Compaction Inspection Forms	3.7.2													
45			02 61 13	07	Certificates	Professional Structural Engineer Certificate		G												
46			03 30 00	05	Design Data	Concrete Mix Design		G												
47			03 30 00	06	Test Reports	Concrete Mix Ticket	1.4.1													
			03 30 00	06	Test Reports	Slump Tests	1.4.2													
48			03 30 00	06	Test Reports	Temperature Tests	1.4.3													
49			03 30 00	06	Test Reports	Air Content	1.4.4													
50			03 40 00	05	Design Data	Concrete Manhole and Box Culverts		G												
51			03 40 00	05	Design Data	Precast Concrete Mix Design		G												
52			03 40 00	06	Test Reports	Concrete Mix Ticket	1.4.1													
53			31 23 00	01	Preconstruction Submittals	Borrow Source Work Plan	1.4	G												
			31 23 00	05	Design Data	Repository Winterization Plan	3.9.1	G												
54																				
55																				
56																				
57																				

	TITLE:	North Ridge Estates Superfund Site																			
	JOB NAME:	Operable Unit 1 Remedial Action																			
	LOCATION:	Klamath County, Oregon																			
	CONTRACT NO:																				
	CONTRACTOR:																				

SUBMITTAL REGISTER

									CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
	(a)	(b)	(c)	(d)			(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	
			31 23 00	07	Certificates	Filter Media Sand Gradation	2.2.1														
			31 23 00	07	Certificates	Gravel Gradation	2.2.2														
58			32 12 17	05	Design Data	Job-Mix Formula		G													
59			32 12 17	06	Test Reports	Asphalt Mix Ticket	1.4.1														
60			32 92 19	03	Product Data	Erosion Control Blankets	2.5														
61			32 92 19	05	Design Data	Growth Media Development Plan	2.1														
62			32 92 19	06	Test Reports	Agronomic Soil Data	3.1														
63			32 92 19	07	Certificates	Residential and Native Seed Mixtures	2.2.1														
64			32 92 19	07	Certificates	Organic Matter Amendments	2.1.1														
65			32 92 19	07	Certificates	Fertilizer	2.1.2														
66			32 92 19	08	Manufacturer’s Instructions	Erosion Control Materials															
67			33 42 00	02	Shop Drawings	Corrugated Metal Pipe	2.1														
68			33 42 00	07	Certificates	Corrugated Metal Pipe	2.1														
69																					
70																					

SECTION 01 35 12

ROAD MAINTENANCE AND DUST CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include requirements for the E&R Contractor to perform road maintenance and repair, dust control operations, and pavement inspection, in an approved manner, whenever necessary, as shown in the Contract Drawings, or when directed by the RA Construction Manager. The objective of all dust control measures shall be to allow no visible dust during construction activities. Dust control shall be generally accomplished with water. Magnesium chloride may be used, as directed by RA Construction Manager.

Maintain roads that are used by construction equipment and trucks. Collman Dairy Road, Old Fort Road, Scott Valley Drive, and Thicket Court outside the North Ridge Estates development and North Ridge Drive and Hunters Ridge Road within North Ridge Estates development shall be inspected, monitored, and repaired if periodic inspections reveal deterioration compared with pre-construction conditions. A formal inspection process will be performed by the RA Construction Manager.

The E&R Contractor shall keep all surfaces being used by public traffic and construction operations free of all dirt, mud, gravel, materials and other debris and shall repair any damage to surfaces caused by the E&R Contractor's operations. The E&R Contractor shall be solely responsible for damages arising from the contractor's operations; the contractor's negligence, gross negligence, or intentional wrongful acts; and the contractor's failure to comply with any Contract provision.

Before winter shutdown, provide satisfactory surface conditions on all roads listed herein as approved by the RA Construction Manager. Do not leave abrupt edges. Remove or cover temporary construction signs unless otherwise directed. Clean, install, and reinstall all necessary channelization and pavement markings, as directed.

Provide traffic control during maintenance and repair work in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

OREGON DEPARTMENT OF TRANSPORTATION (ODOT)

00330 OSSC	Earthwork
00331 OSSC	Subgrade Stabilization
00344 OSSC	Treated Subgrade
00350 OSSC	Geosynthetic Installation

00370 OSSC	Finished Roadbeds
00610 OSSC	Reconditioning Existing Roadway
00620 OSSC	Cold Plane Pavement Removal
00641 OSSC	Aggregate Subbase, Base, and Shoulders
00744 OSSC	Asphalt Concrete Pavement
00745 OSSC	Asphalt Concrete Pavement - Statistical Acceptance
00746 OSSC	Crack Sealing Flexible Pavements
00748 OSSC	Asphalt Concrete Pavement Repair
00749 OSSC	Miscellaneous Asphalt Concrete Structures
00850 OSSC	Common Provisions for Pavement Markings
00855 OSSC	Pavement Markers
00860 OSSC	Longitudinal Pavement Markings - Paint

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Magnesium Chloride Acceptance

Certification that the magnesium chloride solution was obtained from an acceptable source shall be submitted to the RA Construction Manager for approval at least 30 days before the material is required for use or as specified.

1.4 ROAD SURFACE INSPECTION

Inspection of Collman Dairy Road, Old Fort Road, Scott Valley Drive, Thicket Court, North Ridge Drive, and Hunters Ridge Road shall be performed before and after construction each season, and during and will include the collection of photograph and/or video to document road conditions.

PART 2 PRODUCTS

2.1 WATER

Provide water as needed for construction and dust suppression purposes. Water shall be clear, free of contaminants, and meet all EPA and State regulations.

2.2 MAGNESIUM CHLORIDE

Furnish magnesium chloride brine solution consisting of water and magnesium chloride with the following chemical composition (percent by weight):

a. Magnesium chloride - 28 percent, minimum

b. Sulfate - 4.3 percent, maximum

c. Nitrate - 5.0 percent, maximum

The magnesium chloride brine solution shall have a pH between 4.5 and 10.0.

RA Construction Manager may require sampling of the magnesium chloride prior to any mixing with water to validate certifications furnished by the E&R Contractor.

The E&R Contractor shall supply suitable equipment to meet application specifications herein.

2.3 MATERIALS FOR ROAD MAINTENANCE AND REPAIR

Provide all materials for road maintenance, repair, and replacement according to this specification and the Oregon Standard Specifications for Construction (OSSC) described further in Part 3 herein.

PART 3 EXECUTION

3.1 WATER APPLICATION

Apply water to access roads, haul roads, county roads, vehicle and equipment staging areas, or other areas requiring dust control using a water truck. Spray water at a rate and frequency that limits visible dust and does not produce sheet flow and/or erode existing road surface or shoulders.

Dust control at excavation areas within OU1 and at borrow sources shall be performed in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION.

3.2 MAGNESIUM CHLORIDE APPLICATION

Magnesium chloride shall not be applied without approval from the RA Construction Manager.

Magnesium chloride may be applied during a light rain provided the solution penetrates the road surface and does not flow to low surfaces or off the road surface.

Apply water to the roads as directed by the RA Construction Manager to ensure near-optimum moisture content that will allow adequate penetration of the magnesium chloride brine.

Equipment shall ensure uniform distribution across the width of the road surface.

Solution application shall be two light applications at a uniform rate. The final application rate shall be 0.4 to 0.6 gallons per square yard (0.044 to 0.066 gallons per square foot), split between the two

applications, with uniform pressure and application.

Distribution equipment shall include accurate volume measuring devices or a calibrated tank, a thermometer, a spray bar that distributes a uniform volume across the bar, and a hose-and-nozzle attachment to apply solution to areas inaccessible to the spray bar. A standard water truck is not considered appropriate distribution equipment.

Do not apply the second application until the first has adequately penetrated.

Protect areas which shall not receive application and do not allow it to flow into ditches or streams.

As directed by the RA Construction Manager, traffic shall not be permitted on the magnesium chloride brine applied roads until it has penetrated and cured enough to prevent excessive pickup under traffic.

3.3 DUST AND EROSION CONTROL

Dust control shall be used throughout the work areas and offsite. The E&R Contractor shall implement and maintain dust controls such that visible dust on roadways is limited during construction activities. At a minimum, the following provisions shall be implemented:

a. Implement dust minimization controls during construction operations and as directed by the RA Construction Manager. Special care shall be exerted when winds exceed 25 mile per hour.

b. Use water or a water-based dust suppressing agent in addition to magnesium chloride to prevent the creation and dispersion of dust. Avoid methods that generate slippery conditions or sticky mud. Other types of dust suppression agents may be used only with approval from the RA Construction Manager.

c. Do not use water as a dust-suppressing agent on roads when the temperature falls below 32 degrees Fahrenheit.

d. Periodic visual dust monitoring shall be conducted along active vehicle routes. Additional dust suppression may be required, as directed by the RA Construction Manager, if visible dust is reported.

3.4 COLLMAN DAIRY ROAD

Repair Collman Dairy Road, as necessary depending on frequency of use, and as directed by the RA Construction Manager. Repairs shall include periodic regrading and resurfacing with gravel, as well as full depth spot repairs, as necessary.

Regrade road using appropriately sized grader as approved by the RA Construction Manager. Provide and apply water to the road as required to ensure uniform grading and to limit dust.

Repair work shall be completed in accordance with Klamath County Standard Drawing No. 114, Oregon Standard Specifications for Construction (OSSC) Section 00641 OSSC Aggregate Subbase, Base, And Shoulders, and/or in accordance with Section 31 23 00 EARTHWORK AND FILL. Any subgrade or earthwork work shall be in accordance with those sections listed in 3.5a through 3.5f below.

3.5 OLD FORT ROAD, SCOTT VALLEY DRIVE, AND THICKET COURT

Repair Old Fort Road, Scott Valley Drive, and Thicket Court based on pavement inspection and as directed by the RA Construction Manager. Repairs may include, but are not limited to, crack sealing, patching, resurfacing, overlay, and partial or full depth repair. Provide and apply water to the road as required and directed by the RA Construction Manager.

Repair work shall be completed as directed by the RA Construction Manager and in accordance with the following OSSC section(s) or in accordance with specification section(s) herein, as applicable to required repair elements:

a. All excavation, embankment, and other earthwork items shall be performed in accordance with Section 31 23 00 EARTHWORK AND FILL or Section 00330 OSSC.

b. Subgrade work shall be performed as necessary when existing subgrade materials are unsuitable. Subgrade stabilization through excavation and disposing of unstable materials and placing approved embankment material shall be performed in accordance with Section 00331 OSSC. Treated subgrade for purposes of stabilization using lime, chloride, or Portland cement shall be performed in accordance with Section 00344 OSSC. Furnishing and placing geotextile over roadbed subgrades with full depth repair or subgrade stabilization shall be performed in accordance with Section 00350 OSSC. Trimming, shaping, and finishing the subgrade shall be performed in accordance with Section 00370 OSSC.

c. Reconditioning and preparing of existing subgrades, bases, surfacing and pavements on which an additional layer or course of material is to be placed shall be performed in accordance with Section 00610 OSSC.

d. Asphalt concrete pavement repair shall be performed in accordance with Section 00748 OSSC and may include work from the surface to the subgrade. Removing existing pavement to prepare a foundation for placing new surfacing using cold planing shall be performed in accordance with Section 00620 OSSC. Furnishing and placing one or more layers of aggregates, mixed with water, on a prepared surface for use as subbase, base, or shoulders shall be performed in accordance with Section 00641 OSSC. Hot mix asphalt concrete pavement shall be constructed in accordance with Section 00744 OSSC when the quantity is less than or equal to 2,500 tons. If more than 2,500 tons of hot mix asphalt concrete is necessary for the required repair, Section 00745 OSSC shall be used. Repairing and resealing cracks shall be performed in accordance with Section 00746 OSSC. Asphalt concrete repair in road approaches, street connections, driveways, guardrail flares, mailbox turnouts, raised traffic islands, sidewalks, footpaths, gutters, ditch linings, spillways, dikes, and other miscellaneous or minor items of asphalt concrete shall be performed in accordance with Section 00749 OSSC.

e. Furnishing, preparing, and installing all forms of pavement markings shall be performed in accordance with Section 00850 OSSC. Install reflective pavement markers along the centerline and elsewhere if existing in accordance with Section 00855 OSSC. In addition to the requirements of Section 00850 OSSC, install painted longitudinal pavement markings, including but not limited to 4 inches wide double-solid, yellow center lines and 4 inch solid, white edge lines in accordance with Section 00860 OSSC.

3.6 NORTH RIDGE DRIVE AND HUNTERS RIDGE ROAD

Provide dust control along North Ridge Drive and Hunters Ridge Road, as directed by the RA Construction Manager. In addition, provide limited maintenance and temporary repair to ensure safe use not detrimental to construction operations or public travel as directed by the RA Construction Manager.

-- End of Section --

SECTION 01 35 29

SAFETY, HEALTH, AND EMERGENCY RESPONSE

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the requirements for E&R Contractor's to implement practices and procedures for working safely and in compliance with Occupational Safety and Health Administration (OSHA) regulation while performing asbestos and arsenic-contaminated soil remediation at the North Ridge Estates Superfund Site.

This includes furnishing all labor, materials, equipment, and incidentals required for the protection of human health.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ISEA Z358.1	(2009) American National Standard for Emergency Eyewash and Shower Equipment

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.134	Respiratory Protection
29 CFR 1910.140	Fall Protection
29 CFR 1910.165	Employee Alarm Systems
29 CFR 1910.1030	Bloodborne Pathogens
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.21	Safety Training and Education
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
29 CFR 1926.1101	Asbestos

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 85-115	(1985) Occupational Safety and Health

Guidance Manual for Hazardous Waste Site Activities

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Site Safety and Health Plan (SSHP); G

Submit no later than 30 calendar days after receipt of Notice to Proceed.

SD-03 Product Data

Site Control Log

A site control log of personnel visiting, entering, or working on the site shall be maintained.

SD-05 Design Data

Work Zones; G
Decontamination Facilities; G

SD-07 Certificates

Employee Certificates

1.4 REGULATORY REQUIREMENTS

Work performed under this contract shall comply with OSHA requirements in 29 CFR 1910 and 29 CFR 1926, especially OSHA's Standards 29 CFR 1926.65 and 29 CFR 1910.120 and state specific OSHA requirements where applicable. Matters of interpretation of standards shall be submitted to the RA Construction Manager for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

1.5 SITE SAFETY AND HEALTH PLAN (SSHP)

Develop and implement a SSHP. The SSHP shall address all occupational safety and health hazards (traditional construction as well as contaminant-related hazards and other hazards such as biological vectors such as possible hantavirus from rat feces in crawlspaces) associated with cleanup operations. In addition, the SSHP shall include a site security plan that addresses potential site safety hazards and measures to report all security lapses. The SSHP is a dynamic document, subject to change as project operations/execution change. The SSHP will require modification to address changing and previously unidentified health and safety conditions. It is the E&R Contractor's responsibility to ensure that the SSHP is updated accordingly. Amendments to the SSHP will be submitted to the RA Construction Manager as the SSHP is updated.

1.5.1 Acceptance and Modifications

Prior to submittal, the SSHP shall be signed and dated by the E&R Contractor's Safety and Health Manager, Site Safety and Health Officer (SSHO) and the Site Superintendent. The SSHP shall be submitted for review 30 calendar days after notice to proceed.

Onsite work shall not begin until the plan has been accepted. A copy of the written SSHP shall be maintained onsite. Changes and modifications to the accepted SSHP shall be made with the knowledge and concurrence of the Safety and Health Manager, the Site Superintendent, and the RA Construction Manager. Should any unforeseen hazard become evident during the performance of the work, the SSHO shall bring such hazard to the attention of the Safety and Health Manager, the Site Superintendent, and the RA Construction Manager for resolution as soon as possible. In the interim, necessary action shall be taken to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted SSHP shall be cause for stopping work until the matter has been rectified.

1.5.2 Availability

The SSHP shall be made available in accordance with 29 CFR 1910.120, (b)(1)(v) and 29 CFR 1926.65,(b)(1)(v).

1.5.3 Contents

The SSHP shall include, but shall not be limited to, the following general components and requirements specific to the work to be performed under this contract. Some components may not be related to conducting site work and may be excluded from the SSHP. The E&R Contractor is responsible for determination of the measures and procedures to be taken to control physical and chemical hazards associated with the site work and in accordance with applicable regulatory requirements.

a. A list of federal, state and local laws and regulations concerning safety, health, and emergency response.

b. Staff organization, qualifications, and responsibilities.

c. Training requirements.

d. Personal Protective Equipment (PPE) program requirements including personal air monitoring requirements.

e. Medical surveillance program.

f. Site security provisions.

g. Heat and cold stress monitoring and management.

h. Spill and discharge control procedures. These procedures may be included in the Environmental Protection Plan as described in Section 01 57 20 ENVIRONMENTAL PROTECTION.

i. Confined space entry procedures.

j. Work around and with biological hazards (i.e., hantavirus)

k. Hot work procedures.

l. Ignition source identification.

m. Fire protection and prevention and work practices to be employed during fire restriction periods.

n. Electrical safety.

o. Excavation and trench safety.

p. Guarding of machinery and equipment.

q. Lockout/tagout procedures.

r. Fall protection.

s. Hazard communication.

t. Sanitation.

u. Engineering controls.

v. Signs and labels.

w. Personal hygiene and decontamination procedures, including decontamination facilities for personnel.

x. Emergency response plan requirements, including contact information and directions to the nearest medical facility.

1.6 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

An organizational structure shall be developed that sets forth lines of authority, responsibilities, and communication procedures concerning site safety, health, and emergency response. The SSHP shall include a description of this organizational structure as well as qualifications and responsibilities of each of the following individuals. Obtain the RA Construction Manager's acceptance before replacing any member of the Safety and Health Staff.

The safety and health organization shall be separately identified from the project's operations organizations in order to maintain the appropriate degree of independence from day-to-day activities. The project manager shall be responsible for safety and health on the project, including providing the proper and adequate personnel, materials, and resources to implement the safety and health program.

1.6.1 Site Superintendent

A Site Superintendent, who has responsibility to implement the SSHP, and is given by the E&R Contractor as a competent person with the authority to direct work performed under this contract and verify compliance, shall be designated.

1.6.2 Safety and Health Manager (SHM)

1.6.2.1 Qualifications

The services of a Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene shall be used. The name, qualifications (education summary and documentation), and work experience summary shall be included in the SSHP.

1.6.2.2 Responsibilities

The SHM shall:

a. Be responsible for the development, implementation, oversight, and enforcement of the SSHP

b. Sign and date the SSHP prior to submittal

c. Be present onsite as determined necessary for successful program implementation

d. Be available at all times for emergencies

e. Provide consultation as needed to ensure the SSHP is fully implemented

f. Coordinate any modifications to the SSHP with the Site Superintendent, the SSHO, and the RA Construction Manager

g. Provide continued support for upgrading/downgrading the level of personal protection

h. Be responsible for recommending changes to engineering controls, work practices, and PPE

i. Review accident reports and results of daily inspections

j. Serve as a member of the Contractor's quality control staff

1.6.3 Site Safety and Health Officer

1.6.3.1 Qualifications

An individual shall be designated the SSHO. The name, qualifications (education and training summary and documentation), and work experience of the SSHO and an alternate shall be included in the SSHP.

1.6.3.2 Responsibilities

The SSHO shall:

a. Assist and represent the SHM in onsite training and the day-to-day onsite implementation and enforcement of the accepted SSHP. The SSHO shall report directly to the SHM.

b. Have authority to ensure site compliance with specified safety and health requirements: federal, state, and OSHA regulations; and all aspects of the SSHP, including, but not limited to activity hazard analyses, personal air monitoring, use of PPE, decontamination (personnel and equipment), site control, standard operating procedures

used to minimize hazards, safe use of engineering controls, the Emergency Response Plan (ERP), confined space entry procedures, spill containment program, and preparation of records, by performing a daily safety and health inspection and documenting results.

c. Have authority to stop work if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.

d. Consult with and coordinate any modifications to the SSHP with the SHM, the Site Superintendent, and the RA Construction Manager.

e. Serve as a member of the E&R Contractor's quality control staff on matters relating to safety and health.

f. Conduct accident investigations and prepare accident reports.

g. Review results of daily quality control inspections and document safety and health findings.

h. Conduct and/or coordinate with local resources the initial site-specific safety and health training.

1.6.4 Persons Certified in First Aid and Cardio Pulmonary Resuscitation (CPR)

At least two persons who are currently certified in first aid and CPR by the American Red Cross or other approved agency shall be on site and accessible by working radio or phone at all times during site operations. Both persons shall be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard 29 CFR 1910.1030. The person may perform other duties but shall be immediately available to render first aid when needed.

1.7 TRAINING

E&R Contractor and their subcontractors (onsite personnel) involved in intrusive work, or work that could expose them to site-related contamination shall receive training by the E&R Contractor (unless personnel already have up-to-date required trainings) in accordance with the E&R Contractor's written safety and health training program and 29 CFR 1910.120, 29 CFR 1926.65, and 29 CFR 1926.21. A copy of each person's training certificate shall be maintained at the site office for verification purposes as needed. The SSHP shall include a section describing training requirements.

1.7.1 General Hazardous Waste Operations Training

All personnel performing duties with potential for exposure to onsite contaminants shall meet and maintain the following 29 CFR 1910.120/ 29 CFR 1926.65(e) training requirements:

a. Forty hours of offsite hazardous waste instruction (i.e., Hazardous Waste Operations and Emergency Response).

b. Three days of actual field experience under the direct supervision of a trained, experienced supervisor.

c. Eight hours refresher training annually. Onsite supervisors shall have

an additional 8 hours management and supervisor training specified in 29 CFR 1910.120/29 CFR 1926.65(e)(4).

d. Asbestos awareness training in accordance with 29 CFR 1926.1101.

1.7.2 Pre-Entry Briefing

Prior to commencement of onsite field activities, all site employees, including those assigned only to the Support Zone, shall attend a site-specific safety and health training session. This session shall be conducted by the SSHO to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment. Procedures and contents of the accepted SSHP shall be thoroughly discussed. Each employee shall sign a training log to acknowledge attendance and understanding of the training.

1.7.3 Daily Sessions

Daily onsite training (tailgate safety briefings) shall be conducted by the SSHO for personnel assigned to work at the site. The training shall address safety and health procedures, work practices, any changes in the SSHP, work tasks or schedule, results of previous week's air monitoring, review of safety discrepancies, and accidents.

Should an operational change affecting onsite fieldwork be made, a meeting prior to implementation of the change shall be convened to explain safety and health procedures. Site-specific training sessions for new personnel, visitors, and suppliers shall be conducted by the SSHO using the training curriculum outlines developed by the Safety and Health Manager. Each employee shall sign a training log to acknowledge attendance and understanding of the training.

1.8 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Onsite personnel exposed to contaminants shall be provided with appropriate personal protective equipment. Components of levels of protection (C, D and modifications) must be relevant to site-specific conditions, including heat and cold stress potential and safety hazards. Only respirators approved by NIOSH shall be used. Protective equipment and clothing shall be kept clean and well maintained. The PPE section of the SSHP shall include levels and components of protection; site-specific procedures to determine PPE program effectiveness and for onsite fit-testing of respirators; and cleaning, maintenance, inspection, and storage of PPE, as necessary.

1.9 MEDICAL SURVEILLANCE PROGRAM

Meet 29 CFR 1910.120/29 CFR 1926.65 (f) and the following requirements for medical surveillance program for workers performing cleanup operations and who will be exposed to contaminants. Assure the Occupational Physician or the physician's designee performs the physical examinations and reviews examination results. Participation in the medical surveillance program will be without cost to the employee, without loss of pay and at a reasonable time and place.

1.9.1 Frequency of Examinations

Medical surveillance program participants must receive medical examinations and consultations on the following schedule:

a. Every 12 months

b. If and when the participant develops signs and symptoms indicating a possible overexposure due to an uncontrolled release of a hazardous substance on the project

c. Upon termination or reassignment to a job where medical surveillance program participation is not required unless his/her previous annual examination/consultation was less than 6 months prior to reassignment or termination

d. On a schedule specified by the occupational physician

1.9.2 Content of Physical Examinations/Consultation

Verify the following information about medical surveillance program participants:

a. Baseline health conditions and exposure history

b. Allergies/sensitivity/susceptibility to hazardous substances exposure

c. Ability to wear personal protective equipment inclusive of NIOSH certified respirators under extreme temperature conditions

d. Fitness to perform assigned duties

Provide the occupational physician with the following information for each medical surveillance program participant:

a. Information on the employee's anticipated or measured exposure

b. A description of any PPE used or to be used

c. A description of the employee's duties as they relate to the employee's exposures (including physical demands on the employee and heat/cold stress)

d. A copy of 29 CFR 1910.120, or 29 CFR 1926.65

e. Information from previous examinations not readily available to the examining physician

f. A copy of Section 5.0 of NIOSH 85-115

g. Information required by 29 CFR 1910.134

1.9.3 Physician's Written Opinion

Obtain a copy of the physician's written opinion for each employee and furnish to the Safety and Health Manager and the employee before work begins and every 12 months thereafter until the remedial action is complete. Address the employee's ability to perform hazardous waste site remediation work and include the following:

a. The physician's verification of the employee's fitness to perform duties as well as recommended limitations upon the employee's assigned work and/or PPE usage

b. The physician's opinion about increased risk to the employee's health resulting from work

c. A statement that the employee has been informed and advised about the results of the examination

1.9.4 Employee Certificates

Provide employee certificates for each worker performing cleanup operations with potential for contaminant-related occupational exposure signed by the safety and health manager and the occupational physician indicating the workers meet the training and medical surveillance requirements of this contract. Provide copies of these certificates to each employee and at the site office.

1.10 PERSONAL AIR SAMPLING PROGRAM

Prepare and implement by the Safety and Health Manager an exposure monitoring/air sampling program to identify and quantify safety and health hazards and airborne levels of hazardous substances (e.g., asbestos fibers) in order to assure proper selection of engineering controls, work practices, and personal protective equipment for affected site personnel in accordance with 29 CFR 1910.120. This program should be representative of various phases of work and environmental conditions. Include action levels for upgrading/downgrading PPE in the program. Submit personnel exposure monitoring/sampling results. The exposure monitoring/air sampling program shall be incorporated into the SSHP.

1.11 HEAT STRESS MONITORING AND MANAGEMENT

Document in the SSHP and implement the procedures and practices to monitor and manage heat stress.

1.12 SITE CONTROL MEASURES

1.12.1 Work Zones

Initial anticipated work zone boundaries (exclusion zone, contamination reduction zone, support zone, all access points and decontamination areas) are to be clearly delineated on a site drawing(s). Base the delineation of work zone boundaries on the areas of contamination and site-specific sequencing on construction. County roadways are to be considered as clean-corridors in the development of work zone boundaries. As work progresses and field conditions are monitored, work zone boundaries may be modified (and site drawings modified) with approval of the RA Construction Manager. Clearly identify work zones and mark in the field (using fences, tape, signs, etc.). Seal windows and doors of homes with plastic sheeting prior to excavation work to mitigate possible generation of dust indoors. Submit and post a site map, showing work zone boundaries and locations of decontamination facilities in the onsite office. Work zones must consist of the following:

a. Exclusion Zone (EZ): The exclusion zone(s) are area(s) where hazardous contamination is either known or expected to occur and the greatest potential for exposure exists. Control entry into this area, and exit may only be made through the CRZ. Furnish and erect temporary project safety fencing at each of the exclusion zones. The safety fencing must be a high visibility orange colored, high density

polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at approved location(s). Maintain the safety fencing during the life of the contract and, upon completion and acceptance of the work, it will become the property of the Contractor and be removed from the work site after it has been decontaminated.

b. Contamination Reduction Zone (CRZ): The CRZ is the transition area between the EZ and the Support Zone. The personnel and equipment decontamination areas must be separate and unique areas located in the CRZ.

c. Support Zone (SZ): The SZ is defined as areas of the site, other than exclusion zones and contamination reduction zones, where workers do not have the potential to be exposed to hazardous substances or dangerous conditions resulting from contaminated soil excavation operations. Secure the Support Zone against active or passive contamination. Site offices, parking areas, and other support facilities must be located in the SZ.

1.12.2 Site Control Log

A log of personnel visiting, entering, or working on the site must be maintained by the E&R Contractor. Include the following: date, name, agency or company, time entering and exiting site, and time entering and exiting the exclusion zone (if applicable). Before visitors are allowed to enter the CRZ or EZ, they must show proof of current training and medical surveillance and respirator fit testing (if respirators are required for the tasks to be performed) and fill out a Certificate of Worker or Visitor Acknowledgment. Record this visitor information, including date, in the log.

1.12.3 Communication

Provide and install an employee alarm system that has adequate means of communication in accordance with 29 CFR 1910.165. The means of communication must be able to be perceived above ambient noise or light levels by employees in the affected portions of the workplace. The signals must be distinctive and recognizable as messages to evacuate or to perform critical operations.

1.13 SECURITY PROVISIONS

Provide adequate outside security at the site to prevent the public from having access to potential site safety hazards and to prevent the theft of or damage to facilities. The E&R Contractor will be responsible for the security of its own equipment.

In addition, provide security for homes left unoccupied during temporary relocation of residents, including nights, weekends, and holidays. A total of six individual homes and one three-unit apartment may require temporary relocation of residents (relocation to be completed under separate contract by others). The exact number of homes that will require temporary resident relocation will be determined by the RA Construction Manager prior to construction.

1.14 PERSONAL HYGIENE AND DECONTAMINATION

Personnel entering the EZ or CRZ or otherwise exposed to contaminated

materials must decontaminate themselves and their equipment prior to exiting the CRZ and entering the SZ. Consult Chapter 10.0 of NIOSH 85-115 when preparing decontamination procedures. Submit a detailed discussion of personal hygiene and decontamination facilities and procedures to be followed by site workers as part of the SSHP. Train employees in the procedures and enforce the procedures throughout site operations.

Dust suppression shall be conducted as described in Section 01 57 20 ENVIRONMENTAL PROTECTION.

1.14.1 Decontamination Facilities

Submit site drawings showing the layout of the personnel and equipment decontamination areas and facilities. These drawings may be modified as field conditions change.

1.14.2 Personnel Decontamination

Initially set up a decontamination line in the CRZ. Employees must exit the EZ through the CRZ and implement the following decontamination procedures and techniques: remove all outer garments, hand and face wash, shower. Showers, if needed, must comply with 29 CFR 1910.140. It is the SSHO's responsibility to recommend techniques to improve personnel decontamination procedures, if necessary. Dirty PPE such as Tyvek suits and booties, shall be disposed of as asbestos-containing material each time an employee leaves the EZ.

1.14.3 Equipment Decontamination

The vehicles and equipment used in the EZ shall be decontaminated in the CRZ prior to leaving the contaminated soils area every time the vehicles and equipment leave the EZ.

1.14.3.1 Facilities for Material, Equipment, and Personnel

Provide a vehicle/equipment decontamination station within the CRZ for decontaminating vehicles and equipment leaving the EZ. Construct a decontamination station pad (geotextile fabric overlain by gravel, straw wattle, etc.), which meets the site decontamination needs for all vehicles and larger equipment decontamination. A high pressure, low volume, water wash area is needed for material, equipment, and vehicles; water is allowed to drain back into the EZ. Equipment within the EZ or CRZ must be decontaminated before maintenance is performed.

1.14.3.2 Procedures

Procedures for equipment decontamination must be developed and utilized to prevent the spread of contamination into the SZ and offsite areas (e.g., borrow areas, county roadways, etc.). These procedures must address disposal of contaminated products and spent materials used on the site, including containers, fluids, oils, etc. Assume any item taken into the EZ is contaminated. Vehicles, equipment, and materials must be cleaned and decontaminated each time they leave the EZ. Handle construction material in such a way as to minimize the potential for contaminants being spread and/or carried offsite. Prior to exiting the contaminated soil areas, vehicles and equipment must be inspected to ensure the adequacy of decontamination. If contamination is visibly present on equipment after decontamination, that equipment will be required to undergo additional decontamination procedures, as directed by the RA Construction Manager.

1.15 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

Maintain, as a minimum, the following items onsite and available for immediate use:

a. First aid equipment and supplies approved by the consulting physician

b. Emergency eyewashes and showers that comply with ANSI/ISEA Z358.1

c. Provide fire extinguishers of sufficient size and type at site facilities and in all vehicles and at any other site locations where flammable or combustible materials present a fire risk

d. Posted maps showing location of nearest medical facility and phone number for facility/ambulance services

1.16 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

An Emergency Response Plan that meets the requirements of 29 CFR 1910.120 (l) and 29 CFR 1926.65 (l) must be developed and implemented as a section of the SSHP. In the event of any emergency associated with remedial action, without delay, alert all onsite employees and as necessary offsite emergency responders that there is an emergency situation; take action to remove or otherwise minimize the cause of the emergency; alert the RA Construction Manager; and institute measures necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. Train employees that are required to respond to hazardous emergency situations to their level of responsibility according to 29 CFR 1910.120 (q) and 29 CFR 1926.65 (q) requirements. Rehearse the plan regularly as part of the overall training program for site operations. Review the plan periodically and revised as necessary to reflect new or changing site conditions or information. Provide copies of the Emergency Response Portion of the accepted SSHP to the affected local emergency response agencies. Address, as a minimum, the following elements in the plan:

a. Pre-emergency planning. Coordinate with local emergency response providers during preparation of the Emergency Response Plan to ensure emergency responders understand the health threat of asbestos contamination at Operable Unit 1 (OU1). At a minimum, coordinate with local fire, rescue, police, and emergency medical providers to assure all organizations are capable and willing to respond to and provide services for onsite emergencies. Ensure the Emergency Response Plan for the site is compatible and integrated with the local fire, rescue, medical and police security services available from local emergency response planning agencies.

b. Personnel roles, lines of authority, communications for emergencies.

c. Emergency recognition and prevention.

d. Site topography, layout, and prevailing weather conditions.

e. Criteria and procedures for site evacuation (emergency alerting procedures, employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control).

f. Specific procedures for decontamination and medical treatment of injured personnel.

g. Route maps to nearest pre-notified medical facility. Site-support vehicles must be equipped with maps. At the beginning of project operations, drivers of the support vehicles must become familiar with the emergency route and the travel time required.

h. Emergency alerting and response procedures, including posted instructions and a list of names and telephone numbers of emergency contacts (physician, nearby medical facility, fire and police departments, ambulance service, federal, state, and local environmental agencies as well as Safety and Health Manager, the Site Superintendent, the RA Construction Manager and/or their alternates).

i. Criteria for initiating community alert program, contacts, and responsibilities.

j. Procedures for reporting incidents to the RA Construction Manager. In the event that an incident, such as an explosion or fire, or a spill or release of toxic materials occurs during the course of the project, the RA Construction Manager will be required to report to the appropriate government agencies immediately. Include within the report the following items:

1. Name, organization, telephone number, and location of the Contractor.

2. Name and title of the person(s) reporting.

3. Date and time of the incident.

4. Location of the incident, i.e., site location, facility name.

5. Brief summary of the incident giving pertinent details, including type of operation ongoing at the time of the incident.

6. Cause of the incident, if known.

7. Casualties (fatalities, disabling injuries).

8. Details of any existing chemical hazard or contamination.

9. Estimated property damage, if applicable.

10. Nature of damage, effect on contract schedule.

11. Action taken to ensure safety and security.

12. Other damage or injuries sustained, public or private.

k. Procedures for critique of emergency responses and follow-up.

1.17 CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGEMENT

A copy of a Contractor-generated certificate of worker/visitor acknowledgement must be completed and submitted for each visitor allowed to enter contamination reduction or exclusion zones and for each employee.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

(NOT USED)

-- End of Section --

SECTION 01 36 20

PERIMETER AIR MONITORING

PART 1 GENERAL

1.1 SCOPE OF WORK

This section describes the responsibilities of the E&R Contractor for monitoring potentially contaminated particulates at the exclusion zone perimeter. This section is to be used in the preparation of Perimeter Air Monitoring Plan (PAMP). The work performed under these specifications will be actively managed so that potential for airborne dust and contaminants generated by site activities be maintained below the applicable allowable levels to ensure engineering controls are effective.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Perimeter Air Monitoring Plan (PAMP); G

The E&R Contractor shall submit the PAMP no later than 30 days after receipt of notice to proceed.

SD-06 Test Reports

Air Monitoring Status Reports

The E&R Contractor shall submit the following documents to the RA Construction Manager on a daily basis during the course of the project site work:

a. Air Sampling Log, including (but not limited to):

1. Sample collection dates and times.

2. Sampling equipment and media.

3. Documentation of trigger level exceedances and corrective actions.

b. Air Sample Analysis Results - analytical results and accompanying laboratory QC data/information.

c. Meteorological Readings - Meteorological readings shall be tabulated in accordance with the requirements of this section.

1.3 PERIMETER AIR MONITORING PLAN

The E&R Contractor shall develop, submit and implement after approval of the written PAMP for Remedial Action operations.

1.3.1 Contents

A PAMP shall be prepared covering remediation activities to be performed by the E&R Contractor. The PAMP shall establish, in detail, the protocols necessary for the anticipation, recognition, evaluation, and control of emissions associated with each task performed based upon site-specific conditions.

The PAMP shall be a stand-alone plan and shall include, but not be limited to, the following:

a. Control of airborne contaminant emissions.

b. Air sampling procedures.

c. Collection of meteorological data.

d. Descriptions of equipment, O&M procedures, and calibrations schedules.

e. Plans for response if the trigger levels are exceeded.

f. Named laboratory and accreditations.

g. Work practices and protocols during windy conditions.

1.3.2 Acceptance and Modification

The PAMP shall be submitted to the RA Construction Manager for review and approval. Any deficiencies in the PAMP will be discussed at the pre-construction safety conference, and the PAMP shall be revised to correct the deficiencies and resubmitted for acceptance. Onsite work shall not begin until the plan has been accepted by the RA Construction Manager.

The E&R Contractor shall keep a copy of the written PAMP on site for review by the RA Construction Manager. As work proceeds, the PAMP shall be adapted to new situations and new conditions. Changes and modifications to the accepted PAMP shall be made with the knowledge and concurrence of the E&R Contractor's Safety and Health Manager and the RA Construction Manager. The requested modification shall not be implemented until authorized in writing by the RA Construction Manager. Should the RA Construction Manager require a modification of any portion or provision of the PAMP, the RA Construction Manager will notify the E&R Contractor in writing of such modifications.

The RA Construction Manager may stop all site work at any point if the E&R Contractor shows any disregard for the provisions of this specification or the accepted PAMP.

1.4 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

The E&R Contractor's project team shall include:

1.4.1 Air Quality Specialist (AQS)

This sampler shall be familiar with this site's hazards and the scope of this project. The E&R Contractor shall document the sampler's name and qualifications in the PAMP. The Project Chemist, in accordance with Section 01 45 10 CHEMICAL DATA QUALITY CONTROL, shall also serve an Air Quality Specialist.

The E&R Contractor shall demonstrate to the RA Construction Manager that this Air Quality Specialist has the following credentials:

a. At least three years of experience in air monitoring or sampling, including the following:

    1. Serving in responsible professional charge on at least one project in which perimeter air asbestos monitoring was required.

    2. Hands-on experience in taking ambient air measurements and samples.

b. A scientific or engineering college degree that included the study of air quality issues. The RA Construction Manager may accept equivalent training at its sole discretion.

c. Appropriate credentials for working on the site under the SSHP.

d. Professional certification appropriate to this effort.

    1. Although the RA Construction Manager may accept other credentials, the Certified Industrial Hygienist credential offered by the American Board of Industrial Hygiene and the Qualified Environmental Professional credential offered by the Institute for Professional Environmental Practice are both deemed appropriate.

1.4.2 Responsibilities

The Air Quality Specialist shall be responsible for:

a. Coordinating work compliance with the PAMP and this specification.

b. Preparation of the air sampling protocols for the site work.

c. Selecting the equipment to be used for air sampling.

d. Determining the times, durations, and locations of air measurements and samples

e. Interpreting the results of the air sampling effort.

1.5 PERIMETER AIR MONITORING PRINCIPLES

The E&R Contractor shall provide all equipment, materials, and personnel necessary to monitor and quantify air borne dust and fibers at the exclusion zone perimeter. The PAMP shall describe procedures, equipment, and training needed to monitor and quantify the amount of airborne asbestos particulate generated by site work activities. The E&R Contractor shall operate a program of equipment maintenance in accordance with the manufacturer's specifications.

1.6 LABORATORY CERTIFICATION REQUIREMENTS

The laboratory must be accredited by the National Institute of Standards and Technology (NIST)/National Voluntary Laboratory Accreditation Program (NVLAP) for bulk and airborne asbestos analysis and by the American Industrial Hygiene Association (AIHA). The laboratory shall also be a successful participant in the National Institute for Occupational Safety and Health (NIOSH) proficiency analytical testing (PAT). The laboratory

shall have participated in, and acceptably analyzed, the required parameters in the last two proficiency examinations from both NVLAP and the AIHA or an equivalent program.

1.7 TRIGGER LEVEL TO EVALUATE ENGINEER CONTROLS

The E&R Contractor is responsible for the analysis of perimeter air sampling around the boundaries of the exclusion zones. Perimeter air samples are to be analyzed by transmission electron microscopy (TEM) Asbestos Hazard Emergency Response Act (AHERA) method. If more than 0.01 asbestos structures per cubic centimeter (s/cc) are detected or if samples are overloaded on a perimeter air sample, site-specific engineering controls and work practices shall be reviewed by the E&R Contractor and RA Construction Manager. Following the evaluation, engineering control or work practice modifications may be implemented. The E&R Contractor is responsible for implementing any necessary corrective actions immediately.

PART 2 PRODUCTS

2.1 GENERAL

The E&R Contractor shall provide all necessary sampling devices, pumps and collection media, and support equipment to perform the sampling per the approved PAMP. This may include, but is not limited to the following:

a. Sampling pump – Low-volume battery powered, such as an SKC Airchek Sampler Model 224-PCXR4, high-volume direct current Gast 1532 rotary vane pump, or equivalent used for collecting air samples.

b. Phase contrast microscopy (PCM) sample cassettes - commercially available 25 millimeter(mm), three-piece cassette with a 50mm electronically conductive extension cowl loaded with a 0.8 micron (µ) mixed cellulose ester (MCE) filter.

c. Sampling stands – telescoping tripods designed specifically to hold sample cassettes at the desired height will be used to support the sample cassette in order to isolate the sample from the vibrations of the sampling pump.

d. Inert tubing – Tygon tubing used in the sampling train to connect the outflow end of the sample cassette to the sampling pump. Tubing has a 3/16″ inner diameter and 5/16″ outer diameter.

e. Rotameter – A rotameter calibrated such that the operator can measure flow rates to ±5% accuracy at the expected sampling flow rate. A rotameter is used as a secondary calibration device.

f. Drycal – Drycal will be used to calibrate the rotameter on a quarterly basis. A Drycal is used as a primary calibration device.

PART 3 EXECUTION

3.1 DUST CONTROL

Dust control requirements shall be in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION. The E&R Contractor's Safety and Health Manager shall ensure that dust suppression practices are effective and being utilized.

3.2 PERIMETER AIR SAMPLING

The E&R Contractor shall conduct engineering control monitoring to ensure proper work practices are employed and prevent contamination migration outside of each excavation exclusion zone, including work within exclusion zones at the repositories.

The perimeter of each excavation exclusion zone shall be monitored by the E&R Contractor for asbestos structure migration by collecting a stationary air sample from each cardinal direction of the exclusion zone boundary. This will result in the collection of four perimeter samples at each designated excavation location (i.e., exclusion zone) during each day of intrusive remedial activities. Exact perimeter air sample locations will be approved by the RA Construction Manager, based on prominent wind direction, location of activities, location of potential receptors, and professional judgment. The height of each sample cassette shall be no more than 6 feet high.

The E&R Contractor shall collect perimeter air samples, which are representative of approximately 80 percent or more of each day's intrusive remedial activities. Each perimeter air sample shall be collected at a rate of 1.0 to 10.0 liters per minute (L/min) and have a minimum volume of 1,200 liters. The flow rate will be set depending upon the type of sampling pump used (i.e., high versus low volume) and expected duration of the sampling period. The sampling pump will provide a non-fluctuating air flow through the filter, and will maintain the initial volume flow rate to within ±10% throughout the sampling period. If at any time the measurement indicates that the flow rate has increased or decreased by more than 10% of the set flow rate, sample collection will cease and the sample will be voided. As samples are initially collected during the sampling event and analyzed, flow rates and sample times may be adjusted to ensure the loading on the sample filter facilitates reaching the required sensitivity goals (i.e., to prevent filter overloading).

Samples shall require a verbal turn-around time from the laboratory of 24 hours (within laboratory working hours) to ensure data is representative of current engineering controls. The E&R Contractor may request additional turn-around time, as approved by the RA Construction Manager, if 24 hours is not feasible given the isolated location of the site.

The laboratory will attempt to achieve the target analytical sensitivity of 0.005 cc-1 using direct sample preparation techniques. The reporting rules for asbestos fibers shall be length greater or equal to 0.5 µm and aspect ratio greater than or equal to 5:1. In the event that a perimeter air sample is determined to be overloaded by the analyst, the laboratory will contact the E&R Contractor to report the issue. When necessary, with approval from the RA Construction Manager, the analyst will proceed with analysis using the indirect sample preparation method.

The stopping rules for stationary air samples are as follows:

1. Examine a minimum of two grid openings from each of two grids.

2. Continue examining grid openings until one of the following is achieved:

    a. The target analytical sensitivity (0.005 per cubic centimeter [cc-1]) is achieved.
    b. A total filter area of 0.1 mm2 of filter area has been examined,

or
c. 25 asbestos structures are recorded.

When one of these criteria has been satisfied, complete the examination of the final grid opening and stop.

For lot blanks and field blanks, the TEM analyst should examine an area of 0.1 mm2 (approximately 100 grid openings).

If perimeter air samples are continuously below trigger levels for a period of 10 continuous working days, the E&R Contractor may reduce the frequency of sampling. If sampling frequency is reduced, the frequency must be re-evaluated if construction methods and/or climatic conditions change. Changes in sampling frequency must be approved in writing by the RA Construction Manager.

3.3 PERIMETER AIR SAMPLING FIELD QC SAMPLES

The field QC samples associated with perimeter air samples are lot blanks and field blanks as shown below.

Sample Type	**Analysis Frequency**	**Analysis Request**	**Acceptance Criteria**
Lot Blank	1 lot blank per 500 sample cassettes used	TEM AHERA	No asbestos structures by TEM AHERA
Field Blank	1 per 20 sample cassettes used	TEM AHERA	No asbestos structures by TEM AHERA

3.3.1 Lot Blanks

Lot blanks are prepared by submitting unused cassettes for analyses prior to putting the group (i.e., lot) of cassettes into use. Lot blanks shall be collected and analyzed at a frequency of 1 per 500 cassettes from the same lot. The lot blanks will be analyzed by TEM AHERA. Lot blanks will be identified on the COC form so that the analytical laboratory is aware of their use and can immediately notify the appropriate parties if asbestos fibers are detected on the filters. If the lot is proved to be contaminated with one or more asbestos structures by TEM AHERA, then the lot of cassettes will be discarded and a new lot of cassettes will be acceptance tested. The standard turnaround time for lot blank results is three days.

3.3.2 Field Blanks

The field blank cassettes will come from the same lot as the cassettes used that day for air sample collection. One field blank shall be analyzed at a frequency of 1 per 20 cassettes. Perimeter air field blanks shall be analyzed by TEM AHERA. The field blank sample results will be reviewed by the E&R Contractor. If any asbestos is detected on a field blank, then the E&R Contractor shall contact the RA Construction Manager to determine whether the occurrence displays a trend in poor sample collection

technique or is an isolated incident. If field blank contamination appears to be a consistent deficiency at the field level, the E&R Contractor shall immediately re-train staff on proper sample collection. If the field blank contamination appears unrelated to field processes, the RA Construction Manager may request that additional field blanks be collected and analyzed and will discuss any quality issues with the analytical laboratory analyzing the field blanks. In addition, a qualifier of “FB” will be added to the related field sample results in the project database to denote that the associated field blank had asbestos structures detected. A field blanks turnaround time will be the turnaround time of the field samples being relinquished on the same COC.

3.4 METEOROLOGICAL MONITORING

The E&R Contractor shall maintain a portable meteorological station for the continuous observation and recording of wind speed, wind direction, ambient air temperature, atmospheric pressure, atmospheric humidity, solar insulation, and atmospheric precipitation. The station shall also include a continuous readout temperature gauge and a rainfall gauge.

The meteorological station shall be positioned to provide representative data on the overall atmospheric diffusion conditions at the site. Visual wind direction indicators will be established in a central location at each active work area. The meteorological station shall be installed in an area relatively free of trees and houses, at the office trailer or in the Support Zone of the site. The station will be able to produce a 24-hour average figure for each parameter so that the weather influences on the air samples can be characterized.

Hourly averages of all meteorological parameters during the entire air monitoring program will be collected, tabulated, and verified to supplement assessment of air sample results.

3.5 RESPONSE TO AIR EMISSIONS TRIGGER LEVEL FAIL

When the air sampling system reveals that the trigger level has been exceeded, the E&R Contractor shall notify the RA Construction Manager, and implement corrective action to reduce site-related emissions to below required trigger levels. The adequacy of these controls is subject to acceptance by the RA Construction Manager prior to restarting intrusive activities. The E&R Contractor shall report the exceedance in its daily air sampling summary report.

Site emissions control measures that may be needed to reduce the emissions to below trigger levels may include, but are not limited to:

a. Adding moisture to the soil

b. Applying a vapor barrier (plastic) to the soil or soil piles

c. Using a misting system

d. Reducing the speed of equipment that disturbs the soil

e. Installing barriers to reduce wind speed

f. Limiting the rate of excavation

3.6 INSPECTIONS

The E&R Contractor shall perform and document daily inspections of the job site and the surrounding work in progress to ensure compliance with PAMP. The RA Construction Manager may stop all site work at any point if the E&R Contractor shows any disregard for the provisions of this specification or the accepted PAMP.

-- End of Section --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date, and title. The document number used in the citation is the number assigned by the standards producing organization, (e.g., American Society for Testing Materials [ASTM] B564 Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers, which were not assigned by the standards producing organization, should be ordered from the source by title rather than by number.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
444 North Capital Street, NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@aashto.org
Internet: http://www.aashto.org

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1819 L Street, NW, 6th Floor
Washington, DC 20036
Ph: 202-293-8020
Fax: 202-293-9287
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Internet: http://www.ansi.org/

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Lexington, KY 40512-4052
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Fax: 610-832-9555
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Internet: http://www.astm.org

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1001 "I" Street
Sacramento, CA 95814
Internet: http://www.arb.ca.gov/homepage.htm

CALIFORNIA COMPOST QUALITY COUNCIL (CCQC)
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Nevada City, CA 95959

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Fax: 202-266-4937
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Internet: http://www.itrcweb.org/

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
Mail Stop C-34
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Cincinnati, OH 45226
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Fax: 513-533-8285
E-mail: nioshdocket@cdc.gov
Internet: http://www.cdc.gov/nchs/products.htm

OREGON ADMINISTRATIVE RULES (O.A.R)
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Salem, OR 97310-1349
Ph: 503-373-0701
Fax: 503-378-4118
E-mail: reference.archives@state.or.us
Internet: http://arcweb.sos.state.or.us/index.html

OREGON BUILDING CODE (OBC)
1535 Edgewater St. NW
Salem, OR 97304
Ph: 503-378-4133
Fax: 503-378-2322
Internet: http://www.cbs.state.or.us/bcd/

OREGON DEPARTMENT OF TRANSPORTATION (ODOT)
355 Capitol Street NE, MS 11
Salem, OR 97301-3871
Ph: 888-275-6368
Fax: 503-986-3432

Internet: http://www.oregon.gov/ODOT/Pages/index.aspx

OREGON FIRE CODE (OFC)
Internet: http://ecodes.biz/ecodes_support/free_resources/Oregon/10_Fire/10_ORFire_main.html

OREGON REVISED STATUTES (O.R.S)
900 Court St. NE
Salem, OR 97301
Ph: 503-986-1914
Internet: http://www.leg.state.or.us/ors/

U.S. COMPOSTING COUNCIL (USCC)
5400 Grosvenor Lane
Bethesda, MD 20814
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Fax: 301-530-5072
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U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
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Alexandria, VA 22312
Ph: 703-605-6050 or 1-688-584-8332
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: http://www.ntis.gov

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)
FHWA, Office of Safety
1200 New Jersey Ave., SE
Washington, DC 20590-
Ph: 202-366-0411
Fax: 202-366-2249

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PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

(NOT USED)

-- End of Section --

SECTION 01 45 00

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the requirements for E&R Contractor to implement and establish quality control that consist of plans, procedures, and organization necessary to produce an end product that complies with the contract requirements and maintains an effective quality control system. This includes furnishing all labor, materials, equipment, and incidentals required for the implementation, establishment, and maintenance of a quality control system.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control Plan; G

Submit no later than 30 calendar days after receipt of Notice to Proceed.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The E&R Contractor is responsible for quality control and shall establish and maintain an effective quality control system. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the RA Construction Manager for non-compliance with quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the RA Construction Manager, and shall be responsible for all construction and construction related activities at the site.

3.2 CONTRACTOR QUALITY CONTROL PLAN

3.2.1 Content of the Contractor Quality Control Plan (CQCP):

The CQCP shall include, as a minimum, the following to cover all

construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the features for all aspects of the work specified. The staff shall include a CQC Manager who shall report to the project superintendent.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC Manager signed by an authorized official of the firm that describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC Manager, including authority to stop work that is not in compliance with the contract. The CQC Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the RA Construction Manager.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. These tests include the following:

    1. Perform perimeter air monitoring for engineering quality control in accordance with Section 01 36 20 PERIMETER AIR MONITORING.

    2. Perform geotextile quality control sampling and testing per the manufacturer's approved quality control manual in accordance with Section 02 05 10 MARKER BARRIER GEOTEXTILE.

    3. Perform geomembrane quality control sampling and testing per the manufacturer's approved quality control manual in accordance with Section 02 05 20 WASTE CONTAINMENT GEOMEMBRANE.

    4. Perform concrete mix and other concrete quality control testing in accordance with Section 03 30 00 CAST-IN-PLACE CONCRETE and Section 03 40 00 PRECAST CONCRETE.

    5. Perform compaction testing in accordance with Section 31 23 00 EARTHWORK AND FILL.

    6. Perform gradation testing on filter media sand, gravel, and screened subsoil needed to produce growth media in accordance with Section 31 23 00 EARTHWORK AND FILL.

    7. Perform asphalt mix quality control testing in accordance with Section 32 12 17 HOT MIXED ASPHALT CONCRETE (ASPHALT).

    8. Perform agronomic testing for quality control of growth media and amendments in accordance with Section 32 92 19 GROWTH MEDIA AND SEED.

f. Procedures for tracking quality control, verification, and acceptance tests, including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task that is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the pre-construction meeting.

3.2.2 Acceptance of Plan

Acceptance of the CQCP is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The RA Construction Manager reserves the right to require the E&R Contractor to make changes in its CQCP and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.3 Notification of Changes

After acceptance of the CQCP, notify the RA Construction Manager in writing of any proposed change. Proposed changes are subject to acceptance by the RA Construction Manager.

3.3 QUALITY CONTROL MEETING

During the pre-construction meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of E&R Contractor's Management and control with the RA Construction Manager's Quality Assurance. Subsequent meetings will be held weekly in accordance with Section 01 20 10 PROJECT MEETINGS to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by the E&R Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. Provide a CQC organization that shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the RA Construction Manager. Provide adequate office space, filing systems, and other resources as

necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, shop drawings submittals, schedules, and all other project documentation shall be promptly furnished to the CQC organization by the E&R Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the RA Construction Manager.

3.4.2 CQC Manager

Identify as CQC Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the E&R Contractor. This CQC Manager shall be available to visit the site at times during construction to verify compliance and will be employed by the E&R Contractor, except as noted in the following. An alternate for the CQC Manager will be identified in the plan to serve in the event of the system manager's absence. The requirements for the alternate will be the same as for the designated CQC manager.

The CQC Manager shall be an experienced construction person with a minimum of 3 years' experience in related work. The CQC Manager may be assigned other duties such as project manager and or safety officer in addition to quality control. The project superintendent may fulfill the CQC manager role.

3.4.3 Organizational Changes

Obtain RA Construction Manager's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

3.5 SUBMITTALS AND DELIVERABLES

Submittals shall be as specified in Section 01 33 00 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements. The E&R Contractor may use standard report forms for submittal of any required data subject to the approval of the RA Construction Manager.

3.6 QUALITY CONTROL

Contractor Quality Control is the means by which the E&R Contractor ensures that the work performed, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all operations, including analytical chemistry and both onsite and offsite fabrication. Such controls will be keyed to the proposed construction sequence.

3.7 TESTS

3.7.1 Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product that conforms to contract requirements. Individual specification sections may also require additional testing. Submit all materials test reports on forms standard to industry standards such as American Concrete Institute (ACI), American Society for Testing and Materials (ASTM) and American Association of State Highway and

Transportation Officials (AASHTO), as applicable. Upon request, furnish to the RA Construction Manager duplicate samples of test specimens for possible testing by the RA Construction Manager. Testing includes operation and/or acceptance tests when specified. Perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Provide the specific paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the RA Construction Manager, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the RA Construction Manager. Failure to submit timely test reports may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Materials Testing Laboratories

Provide services of an independent materials testing laboratory for tests. Provide qualified personnel to perform specified inspection, sampling, and testing of materials and methods of construction; comply with specified standards. Maintain and calibrate testing equipment in accordance with the specified test methods and laboratory quality control procedures; calibration records shall be available for RA Construction Manager inspection upon request. Employment of a testing laboratory shall in no way relieve the E&R Contractor from obligations to perform work in accordance with the Contract. Submit written reports and test results to the RA Construction Manager within 7 calendar days of receipt by E&R Contractor.

3.7.3 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the E&R Contractor.

3.8 SEASONAL COMPLETION INSPECTION

The following provides a summary of the seasonal inspection work required at the completion of work each season:

a. Punch list: At the completion of all seasonal work or any increment thereof, the CQC Manager shall conduct an inspection of the work and develop a "punch list" of items that do not conform to the approved plans and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by Paragraph 3.9 DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC Manager or staff shall make a

second inspection to ascertain that all deficiencies have been corrected and notify the RA Construction Manager. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates. Once this is accomplished, notify the RA Construction Manager that the work is ready for the Pre-Final Inspection.

b. Pre-Final Inspection: The RA Construction Manager, the E&R Contractor, and the Government will perform this inspection to verify that the work is complete in accordance with the contract drawings and technical specifications. The CQC Manager or staff shall ensure that all items on this list have been corrected before notifying the RA Construction Manager so that a Final Inspection can be scheduled. Any items noted on the Pre-Final Inspection shall be corrected.

c. Final Acceptance Inspection: The RA Construction Manager, the E&R Contractor, and the Government shall be in attendance. The Final Acceptance Inspection will be formally scheduled by the RA Construction Manager at least 7 calendar days prior to the Final Acceptance Inspection and shall include the E&R Contractor's assurance that all specific items previously identified to the E&R Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the Final Acceptance Inspection.

3.9 DOCUMENTATION

Maintain current records of quality control operations, activities, and tests performed, including the work of subcontractors and suppliers. These records shall be in an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day (including site photographs, work quantities, etc.) giving location, description, and by whom.

d. Test and/or control activities performed with results and references to specifications/plan requirements. List deficiencies noted along with corrective action.

e. Material received with statement as to its acceptability and storage.

f. Identify status of submittals.

g. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

h. List instructions given/received and conflicts in plans and/or specifications.

i. Contractor's verification statement.

j. These records shall indicate a description of trades working on the

project, the number of personnel working, weather conditions encountered, and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. These records in report form shall be furnished to the RA Construction Manager daily within 24 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed.

3.10 NOTIFICATION OF NONCOMPLIANCE

The RA Construction Manager will notify the E&R Contractor of any detected noncompliance with the foregoing requirements. After receipt of such notice, immediately take corrective action. Such notice, when delivered to the E&R Contractor Site Superintendent at the site of the work, shall be deemed sufficient for the purpose of notification. If the E&R Contractor fails or refuses to comply promptly, the RA Construction Manager may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the E&R Contractor.

-- End of Section --

SECTION 01 45 10

CHEMICAL DATA QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

This section identifies Environmental Data Quality Management requirements for environmental sampling and analysis associated with the project.

This section delineates the responsibilities and procedures for all sampling and analytical activities to assure that the data obtained is of sufficient quality to meet intended uses.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846	Test Methods for Evaluating Solid Waste, Third Edition (Update IV)

CALIFORNIA AIR RESOURCE BOARD (CARB)

CARB 435	Method 435 - Determination of Asbestos Content of Serpentine Aggregate

INTERSTATE TECHNOLOGY AND REGULATORY COUNCIL (ITRC)

ITRC ISM	Incremental Sampling Methodology

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Sampling and Analysis Plan; G

The sampling and analysis plan (SAP), including the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP), no later than 30 days after receipt of notice to proceed.

SD-06 Test Reports

Analytical Data Package; G

The chemistry data package shall be provided to the RA Construction Manager.

Data Validation Report; G

A Data Validation Report shall be provided to the RA Construction Manager. Data Validation Reports shall not lag behind submittal of the associated chemistry data package by more than 1 week. The report shall be labeled with the contract number, field sample IDs, project name and location.

SD-07 Certificates

Project Chemist Qualifications

Environmental Sampler Qualifications

Laboratory Certification

1.4 SAMPLING AND ANALYSIS PLAN

The SAP-QAPP serves several purposes:

a. As a technical planning document, it identifies the purpose of the project, defines the project quality objectives, and outlines the sampling and, analytical, methods and quality assurance/quality control (QA/QC) activities to ensure data that will be used to support environmental decision are appropriate for achieving project quality objectives (PQOs).

b. As an organizational document, it identifies key project personnel, thereby facilitating communication.

c. As an assessment and oversight document, it provides the criteria for confirming that data of the type and quality needed and expected are obtained, and any limitations on the use of the data can be identified and documented. It will also provide criteria for assessment of project implementation and for QA and contractor oversight.

The QAPP shall be composed of standardized, recognizable elements covering all elements for entire project from planning, through implementation, to assessment. The QAAP shall confirm the E&R Contractor's understanding of the contract requirements for chemical data quality control, and shall describe procedures for field sampling and sample submittal for analysis, field chemical parameter measurement, data documentation, data assessment, and data reporting requirements. The SAP shall provide a comprehensive description and full detail for personnel to perform all on-site activities required to attain project PQOs, including: locations of samples, shipment of samples for off-site analyses, sampling procedures for on-site and off-site chemical analysis, summaries of analyses to be performed on samples, measurement performance criteria for on-site and off-site instrumental parameter measurements, data documentation, and reporting requirements. The SAP shall delineate the methods the E&R Contractor intends to use to accomplish the chemical quality control items to assure accurate, precise, representative, complete, legally defensible, and comparable data. The SAP shall describe all chemical parameter measurements for all matrices for all phases of the remediation contract. The SAP shall be provided to field and laboratory personnel. The SAP shall clearly identify the E&R Contractor-obtained laboratories. The E&R Contractor shall furnish copies of the RA Construction Manager-approved SAP to all laboratories and the E&R Contractor's field sampling crew. The SAP shall address all levels of the investigation with enough detail to

become a document which may be used as an audit guide for field and laboratory work.

Execution of fieldwork shall be described in SOPs, which are included in the SAP and laboratory SOPs shall be reviewed by the E&R Contractor's Project Chemist prior to selection of a laboratory.

1.5 TESTING REQUIREMENTS

The work to be completed through this contract will be associated with testing of import materials, such as filter media sand and gravel, as well as organic matter for growth media amendments in accordance with Section 32 92 19 GROWTH MEDIA AND SEED and Gravel and sand in accordance with Section 31 23 00 EARTHWORK AND FILL.

1.6 USE OF LABORATORY RESULTS

Turn-around time (TAT) for laboratory results must allow the E&R Contractor to make determinations regarding the suitability of material prior to utilization of material for site work. If the E&R Contractor chooses to make suitability decisions based on preliminary data, all costs associated with replacing material later found to be unsuitable will be the responsibility of the E&R Contractor.

1.7 QUALITY ASSURANCE ELEMENTS

The E&R Contractor shall be responsible for the following quality assurance elements necessary to monitor and ensure the quality of chemical data produced. The E&R Contractor shall ensure that all subcontract laboratories are in compliance with the Policy to Assure Competency of Laboratories and Field Sampling.

1.7.1 Data Verification

The E&R Contractor is required to perform data verification to ensure that analytical data is complete, that all data requested from the laboratory have been received and comply with specified requirements.

1.7.2 Validation of Data

The E&R Contractor shall be responsible validation of 100 percent of the data in accordance with method requirements. Data will be validated by an independent third party (i.e. someone unassociated and without any interest with the laboratory) and will include assessment of field and laboratory quality control samples such as blanks, matrix spikes, field duplicates, and laboratory method required control samples. A Data Validation Report shall be provided to the RA Construction Manager.

1.8 LABORATORY CERTIFICATION REQUIREMENTS

For the inorganic testing, identify a minimum number of laboratories, prior to the start of work that have NELAP certification consistent with contract required chemical data quality. Identify all proposed project laboratories no later than the pre-construction meeting. If a proposed analytical laboratory cannot meet specified analytical requirements or achieve the required certification, the E&R Contractor shall select another laboratory. The laboratory's certification shall be provided in the QAPP.

For the asbestos testing, the laboratory must be accredited by the National Institute of Standards and Technology (NIST)/National Voluntary Laboratory Accreditation Program (NVLAP) for bulk and airborne asbestos analysis and by the American Industrial Hygiene Association (AIHA). The laboratory shall also be a successful participant in the National Institute for Occupational Safety and Health (NIOSH) proficiency analytical testing (PAT). The laboratory shall have participated in, and acceptably analyzed, the required parameters in the last two proficiency examinations from both NVLAP and the AIHA or an equivalent program.

The E&R Contractor shall propose the analytical laboratories to be used for the samples analyses for material suitability and provide laboratory certification.

1.8.1 Laboratory Analytical Requirements

The E&R Contractor shall provide chemical analyses that meet the project PQOs.

1.8.2 Laboratory Performance

The E&R Contractor shall provide continued acceptable analytical performance and shall establish a procedure to address data deficiencies noted by review. The E&R Contractor shall provide analytical labs with the portion of the QAPP which establishes the measurement performance criteria required and for performing corrective action procedures. The E&R Contractor shall acquire analytical services with additional laboratories in the event a project lab is disqualified through poor performance or loss of applicable accreditation/validation.

1.9 QUALIFICATIONS

1.9.1 Project Chemist

The Project Chemist must have knowledge of environmental analytical chemistry methodologies as described in acceptance criteria table below and quality control procedures applicable to environmental analytical chemistry.

As a minimum, the E&R Contractor's Project Chemist shall have the following qualifications: a 4-year college degree in Chemistry from an accredited post-secondary institution; 4 years of combined professional experience at the level of a commercial environmental analytical laboratory or working as part of a E&R Contractor project management team of which a minimum of 1 year must be directly related to environmental investigations and/or remedial actions as a part of a E&R Contractor management team (i.e., not primarily employed at a laboratory).

The Project Chemist will be expected to have a "hands on" role in management associated with sampling and analysis including preparation of the Sampling and Analysis Plans, instruction of field personnel in sampling and preservation requirements, general oversight of field personnel involved in sampling activities, coordination with the analytical laboratory to ensure readiness to implement project specific requirements, review of analytical data as it becomes available to ensure conformance with quality standards, implementation of corrective actions in accordance with these specifications should review of data uncover deficiencies, and serve as a point of contact with the RA Construction Manager for issues related to environmental chemistry. The Project Chemist

shall conduct or oversee all on-site analytical testing. The Project Chemist shall also prepare all data validation reports or review for accuracy all data validation reports prepared by subcontractors. The Project Chemist shall be employed or subcontracted by the E&R Contractor and shall not be employed by a laboratory performing analyses for this contract.

1.9.2 Environmental Sampler

As a minimum, the E&R Contractor's Environmental Sampler shall have 5 years of experience in and knowledge of EPA methods for collecting environmental and hazardous waste samples and two field seasons of experience with the particular field screening techniques for use on this project. The Environmental Sampler shall review the sampling results, and provide recommendations for the E&R Contractor's sampling program. The Environmental Sampler shall be on-site during remedial activities. The Project Chemist may serve as the Environmental Sampler.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 SAMPLING, ANALYSIS, AND MEASUREMENT

The project objectives for the sampling and analysis are to ensure that growth media amendments and imported filter media sand and gravel are free of contaminants of concern: asbestos and arsenic.

3.1.1 Import Material Chemical Data Requirements

Chemical data testing shall at a minimum, satisfy the following criteria:

Parameter	**Test Method**	**Acceptance Criteria**
Asbestos	PLM, 400 point count CARB 435 -PLM (with Field of View)*	Max. Non-Detect
Arsenic	EPA SW-846-6020 and the ITRC ISM laboratory protocol for metals	Max. 12 mg/kg

Note: * Reference: http://www.arb.ca.gov/testmeth/vol3/m_435.pdf

Samples for material chemical suitability shall be collected as follows:

a. Samples shall be collected either from the offsite source of the imported material (pre-qualified) or from the delivered source of import material. Samples shall be collected at a frequency of one sample per 200 cubic yards or a minimum of two samples per material type if less than 200 cubic yards is imported. Each sample submitted for laboratory analysis shall consist of a 30-point composite sample collected in accordance with the Interstate Technology and Regulatory Council Incremental Sampling Methodology (ITRC ISM).

b. To sample, collect 30-point subsamples from random locations within the material pile. At each location, the sampler shall dig a shallow

hole approximately 12 inches deep to expose fresh material. Equal amounts of soil shall be collected from each subsample location and placed in the sample bag, for a total sample volume of about 1 gallon, for each parameter.

It is the E&R Contractor's responsibility to assure that these requirements are met. The profile will be obtained from a sample representative of the source. This information shall be delivered to the RA Construction Manager as part of the material certification process prior to use of material.

3.2 ANALYTICAL DATA PACKAGE

The analytical data packages shall be provided to the RA Construction Manager with the data validation report. The original, signed copy of the laboratory deliverable shall be delivered to the RA Construction. The following sections describe the requirements for analytical data packages, when applicable to each analytical method.

a. The Contract Laboratory shall document sample conditions on arrival at the laboratory. Signed chain of custody forms shall be provided.

b. The Contract Laboratory shall report all analytes as a detected concentration or as less than the QAPP required reporting limit. Dilution factors, date of extraction, date of analysis, and practical quantification limits shall be reported for each analyte and method.

c. Reports of method blanks shall include all analytes for each analytical method. Analytical results for each sample shall be clearly associated with a particular method blank. Any detected concentration found in method blanks shall be reported down to the laboratory determined method detection limit.

d. MS/MSD recoveries shall be reported for all analyses. Only samples from this project shall be used for MS/MSD analyses. The report shall also specify control limits for spike recoveries and the relative percent difference for each spiked analyte.

e. Results for laboratory duplicates shall be reported with RPD limits for duplicate analyses.

f. Laboratory control sample (LCS) results shall be reported with control limits for LCS analyses. Analytical results for each sample shall be clearly associated with a particular LCS sample.

g. Results of initial and continuing calibration analyses for all analyses shall be included in the data package as well as an analytical run log.

h. The Contract Laboratory shall prepare a summary of all samples with detected concentrations of target compounds indexed by method and by sample ID.

i. The Contract Laboratory shall prepare a summary of all Matrix Spike/Matrix Spike Duplicate analyses for each applicable method indicating acceptable recovery ranges and QC acceptance criteria for RPD.

j. The Contract Laboratory shall prepare a summary of all laboratory and

field duplicates with QC acceptance criteria for RPD clearly indicated.

k. The comprehensive certificate of analysis shall contain a narrative section identifying samples not meeting quality control criteria and any other out of control condition. The narrative shall describe the corrective action taken. If "matrix effects" are invoked as a cause for out of control recoveries a subsection of the narrative shall present a detailed justification for this assertion to include a summary of all relevant quality control data.

3.3 DOCUMENTATION

Documentation records shall be provided as factual evidence that required chemical data have been produced and chemical data quality has been achieved. The documentation shall comply with the requirements specified in paragraphs SAMPLING AND ANALYSIS PLAN and ANALYTICAL DATA PACKAGE.

3.4 NOTIFICATION OF NON COMPLIANCE

The RA Construction will notify the E&R Contractor of any detected non-compliance with the foregoing requirements. The E&R Contractor shall take immediate corrective action after receipt of such notice.

-- End of Section --

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include requirements for the E&R Contractor to install temporary construction facilities, such as equipment and material storage areas (onsite and offsite), access and haul routes, avenues of ingress/egress to storage, and parking at the North Ridge Estates Superfund Site. This includes furnishing all labor, materials, equipment and incidentals required for these temporary construction facilities and controls. This work includes mobilization and demobilization.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

FHWA-MUTCD	(2000) Manual of Uniform Traffic Control Devices

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Site Plan; G

Submit no later than 30 calendar days after receipt of Notice to Proceed. The construction site plan shall include site security.

Traffic Control Plan; G

Submit no later than 30 calendar days after receipt of Notice to Proceed.

1.4 CONSTRUCTION SITE PLAN

Within 30 calendar days after Notice to Proceed, prior to the start of work, submit a construction site plan showing the locations and dimensions of temporary facilities (including layouts and details), equipment and material storage area (onsite and offsite), access and haul routes, decontaminated areas, avenues of ingress/egress to the equipment storage and parking areas. Identify any areas that require a geotextile fabric and gravel overlay to mitigate cross-contamination. Indicate if the use of a supplemental or staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash

dumpsters, temporary sanitary facilities, and worker parking areas.

1.5 TRAFFIC CONTROL PLAN

Within 30 calendar days after Notice to Proceed, prior to the start of work, submit a Traffic Control Plan. Consult with Klamath County Road Division during development of the traffic control activities. The plan must contain, at a minimum, the following elements:

1.5.1 Maintenance of Traffic

Conduct operations in a manner that will minimize obstruction of traffic. Do not close any thoroughfares unless given written permission to do so by the RA Construction Manager at least 15 calendar days prior to the proposed modification date. Provide a traffic control plan for approval, detailing the proposed controls to traffic movement. The plan must be in accordance with State and local regulations and the FHWA-Manual on Uniform Traffic Control Devices (FHWA-MUTCD), Part VI.

Provide, erect, and maintain barriers, signals, passageways, detours, and other items that may be required by Klamath County Road Division.

1.5.2 Protection of Traffic

Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the RA Construction Manager. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, and placing of lights around and in front of work equipment, and the erection and maintenance of adequate warning, danger, and direction signs shall be implemented in accordance with the traffic control plan and as directed by Klamath County Road Division. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit, document existing conditions (i.e., photographs), and repair and/or replace damage to roads caused by construction operations in accordance with Section 01 35 12 ROAD MAINTENANCE AND REPAIR.

1.6 SITE OFFICE SPACE

Access shall be obtained by the RA Construction Manager to utilize the house and detached garage located at both 3636 North Ridge Drive (Parcel Y) and 3601 North Ridge Drive (Parcel X), as shown on the Contract Drawings, for the duration of the construction activities. Parcel Y and the detached workshop garage shall be for E&R Contractor use. Parcel X shall be for RA Construction Manager and the Government (as needed).

The site office must be maintained by the E&R Contractor and kept clean while in use. Any damages to the building will be repaired at the E&R Contractor's expense.

1.7 STORAGE YARD AND PARKING AREA

The driveway and yard areas surrounding the house at 3636 North Ridge Drive (Parcel Y), as shown on the Contract Drawings, may be utilized as storage and parking for the duration of the construction activities, with the exception of when the property must be remediated. If the property is used, a temporary work pad constructed of a 6-inch layer of gravel with

geotextile shall be placed across all usage areas to ensure that contamination does not migrate off property. When the working pad is excavated, the gravel and geotextile shall be disposed of as contaminated material and placed into the onsite repositories. As approved by the RA Construction Manager, identify an alternative storage yard and parking area to be temporarily occupied during excavation of contaminated soil from Parcel Y or propose an excavation sequence that allows continued use of the area.

1.8 TEMPORARY WOOD WASTE PROCESSING AREA

Delineate a wood processing area, as shown on the Contract Drawings or at an alternate proposed location approved by the RA Construction Manager, to chip tree limb material in accordance with Section 31 11 00 CLEARING AND GRUBBING. If contaminated soil is present, construct a working pad, as defined in Paragraph 1.7, within these areas to prevent cross-contamination.

1.9 TEMPORARY CONCRETE PROCESSING AREA

Delineate a concrete processing exclusion zone area, as shown on the Contract Drawings or at an alternate proposed location approved by the RA Construction Manager, to rubblize and stockpile concrete for future marker barrier use (see Section 31 23 00 EARTHWORK AND FILL) when visible ACM is left-in-place. Rebar shall be decontaminated, segregated, and recycled at an approved offsite facility. Construct a working pad, as defined in Paragraph 1.7, within this area to prevent cross-contamination.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Bulletin Board

Immediately upon beginning work, provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the RA Construction Manager. Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees (or in the project office), as approved by the RA Construction Manager.

2.1.2 Project and Safety Signs

The requirements for the project sign, content, and location are as shown on the Contract Drawings. Erect signs prior to commencing site preparation activities at the Site. Safety signs shall be installed adjacent to the bulletin board location or other location approved by the RA Construction Manager.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

E&R Contractor employees will park privately-owned vehicles in an area designated by the E&R Contractor and approved by the RA Construction Manager.

3.2 AVAILABILITY AND USE OF UTILITY SERVICES

The site office spaces (Parcel X and Parcel Y) have been unoccupied for almost 10 years. Improvements to ensure properly functioning utility services may be required.

3.2.1 Temporary Utilities

Make arrangements and pay all costs for temporary utilities required during construction activities to maintain critical services. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

3.2.2 Sanitation

Provide and maintain within the support area minimum field-type sanitary facilities (e.g., portable toilets) approved by the RA Construction Manager and periodically remove waste to a commercial facility. Maintain these conveniences at all times without nuisance. Include provisions for pest control and elimination of odors. The bathroom inside Parcel Y shall remain out-of-order.

3.2.3 Water

Make arrangements and pay all costs for water services. The E&R Contractor shall be responsible for payment of monthly water usage. The E&R Contractor shall be responsible to ensure that there are no leaks and that home is winterized at the end of the season.

3.2.4 Telephone

Make arrangements and pay all costs for telephone facilities. Cell phone reception is limited at Operable Unit 1 (OU1) and cell phone booster may be required.

3.2.5 Internet

Make arrangements and pay all costs for internet connection to facilitate electronic exchange of information and overall management of the contract.

3.2.6 Fire Protection

Provide temporary fire protection equipment (i.e., fire extinguishers) for the protection of personnel and property during construction. In addition, consult with Oregon Department of Fire Protection, Southwest Oregon District for information about fire season regulations (http://www.swofire.com/p/fire-season-regulations.html).

3.3 CONTRACTOR'S TEMPORARY FACILITIES

3.3.1 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site.

3.3.2 Storage Area

Establishment of the E&R Contractor's staging and designated work areas shall be coordinated with the RA Construction Manager. The E&R Contractor

shall be responsible to provide security for the work site area.

3.3.3 Hazardous Materials Storage

Hazardous materials, such as fuel, lubricating oils, and other regulated materials, used onsite shall be stored at the primary storage area. These materials shall not be stored in the EZ or CRZ. Handling of hazardous materials shall comply with requirements as indicated in Section 01 57 20 ENVIRONMENTAL PROTECTION. Keep fencing in a state of good repair and proper alignment.

3.3.4 Appearance of Trailers

Trailers utilized by the E&R Contractor for administrative or material storage purposes must present a clean and neat exterior appearance and be in a state of good repair.

3.3.5 Storm/Severe Weather Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby property. Precautions must include, but are not limited to, closing windows; removing loose materials, tools and equipment from exposed locations; and removing or securing fencing and other temporary work.

3.4 ONSITE COMMUNICATION

If operation by normal voice during construction is not satisfactory, the Contractor must install a satisfactory means of communication (i.e., radio or telephone). These communication devices shall be made available for use by RA Construction Manager personnel.

3.5 DECONTAMINATION FACILITIES

The E&R Contractor shall provide the equipment and materials necessary to properly decontaminate all onsite equipment that comes in contact with contaminated materials and exits contaminated areas into uncontaminated areas. Decontamination of equipment shall be conducted in accordance with Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE.

3.6 DAILY SITE CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud tracked onto paved or surfaced roadways must be cleaned away immediately and disposed of in the onsite repositories.

3.7 RESTORATION OF STORAGE AND PARKING AREA

Upon completion of each construction season, remove the bulletin board, signs (excluding asbestos warning signs around repository between construction seasons), barricades, and any other temporary products from the site.

Upon completion of the remedial action (RA) and after removal of trailers, materials, and equipment from within the staging areas, restore areas to its original or better condition. Temporary gravel working pads must be removed and disposed of in the onsite repositories and the area restored to its original condition, including top soil and seeding as necessary.

-- End of Section --

SECTION 01 57 20

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the requirements for protection of human health and the natural environment during all construction activities that include but are not limited to the protection of land, water, air, cultural, and biological resources as well as waste management and recycling. This includes furnishing all labor, materials, equipment and incidentals required for environmental protection.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions of Waters of the United States
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
40 CFR 68	Chemical Accident Prevention Provisions

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G

Submit no later than 30 days after receipt of Notice to Proceed.

Diesel Emission Control Technology Implementation Plan; G

Submit a diesel emission control technology implementation plan to ensure that onroad and nonroad vehicles and equipment to be mobilized onsite meet the diesel emission control technology requirements for this project.

SD-05 Design Data

Green Remediation Tracking Report

Submit with monthly reporting information, implementation and tracking metric requirements for Best Management Practices (BMPs) and Diesel Emission Control Technology.

1.4 DEFINITIONS

1.4.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally, and/or historically.

1.4.2 Environmental Protection

Environmental protection is the prevention/control of environmental pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air and biological and cultural resources and includes management of visual aesthetics; noise; and solid, chemical, gaseous, and liquid waste as well as other pollutants.

1.4.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the E&R Contractor to execute work but are not fully consumed during the course of construction. Examples include, but are not limited to, diesel, oil, or other petroleum products.

1.4.4 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor must discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur.

1.4.5 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act are defined in 33 CFR 328.

1.5 GENERAL REQUIREMENTS

Minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of site work must be protected during the entire duration of this contract. Comply with all applicable environmental federal, state, and local laws and regulations. Any delays resulting from failure to comply with environmental laws and regulations will be the E&R Contractor's responsibility.

1.6 SUBCONTRACTORS

Ensure compliance with this section by all subcontractors.

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, submit an Environmental Protection Plan for review and approval by the RA Construction Manager 30 days after Notice to Proceed. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues that the E&R Contractor must address during construction. Issues of concern must be defined within the Environmental Protection Plan as outlined in this section. Address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues, which are not identified in this section but are considered necessary, must be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, meet with the RA Construction Manager for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan, including any reporting requirements; and methods for administration of the E&R Contractor's Environmental Plans. The Environmental Protection Plan must be current and maintained onsite by the E&R Contractor.

1.7.1 Compliance

No requirement in this Section will relieve the E&R Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During construction, the E&R Contractor will be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.2 Contents

Include in the Environmental Protection Plan the following:

a. Name(s) of person(s) within the E&R Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.

b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.

c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.

d. Description of the E&R Contractor's environmental protection personnel training program.

e. An erosion control plan, which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan; federal, state, and local laws and regulations; as well as Section 01 57 23 TEMPORARY EROSION CONTROL. A Stormwater Pollution Prevention Plan (SWPPP) may be substituted for this plan.

f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, material storage areas, structures, and stockpiles of excess materials, including methods to control runoff and to contain materials on the site.

g. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas, including methods for protection of features to be preserved within authorized work areas.

h. A spill prevention, control, and countermeasure (SPCC) plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under state or local laws and regulations. In addition, the SPCC shall include storage and housekeeping procedures. The plan shall include as a minimum:

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual will immediately notify the Contracting Officer's Representative and Klamath County Fire District 4 in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. Include in the plan a list of the required reporting channels and telephone numbers.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

3. Training requirements for E&R Contractor's personnel and methods of accomplishing the training.

4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material placement equipment available in case of an unforeseen spill emergency.

6. The methods and procedures to be used for expeditious contaminant cleanup. Include methods and procedures to cleanup spills of asbestos-contaminated soil from haul trucks.

i. Methods and locations for offsite disposal. The plan shall include schedules for disposal. Identify any subcontractors responsible for the transportation and disposal to approved offsite locations. Waste streams designated for offsite disposal include solid waste, demolition debris, recycling, and personal protective equipment (PPE). Delimbed trees shall be transported offsite at an approved lumber processing facility.

j. An air pollution control plan, detailing provisions to assure that dust, debris, materials, trash, etc., do not become airborne and travel off the project site. No visible dust is required from within the exclusion zones or from other contaminated areas onsite. This plan shall also describe corrective actions should dust or perimeter monitoring exceed contract requirements. This corrective action requirement can be included in the Perimeter Air Monitoring Plan (PAMP) in accordance with Section 01 36 20 PERIMETER AIR MONITORING.

k. A contaminant prevention plan that identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with federal, state, and local laws and regulations for storage and handling of these materials. A copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated.

l. A wastewater management plan that identifies the methods and procedures for management and/or discharge of waste waters, which are directly derived from construction activities such as cleanup water or equipment decontamination water. Decontamination water may be discharged on land within contaminated areas (i.e., exclusion zones). Excess decontamination water cannot be discharged offsite or within areas that have been remediated.

1.9 GREEN REMEDIATION REQUIREMENTS

Unless approved otherwise by the RA Construction Manager, include in the Environmental Protection Plan and implement the following green remediation BMPs:

a. Reuse existing structures for command center, storage, sample management, etc. in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

b. Use recycled content (for example, steel made from recycled metals, concrete and/or asphalt from recycled crushed concrete and/or asphalt, respectively, and plastic made from recycled plastic; tarps made with recycled or biobased contents instead of virgin petroleum-based contents)in accordance with this Section herein and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

c. Develop protocol that maximizes the replanting needs (including seed) while minimizing re-mobilization in accordance with Section 32 92 19 GROWTH MEDIA AND SEED.

d. Revegetate excavated areas and/or areas disrupted by equipment or vehicles as quickly as possible using native vegetation, if possible, and restore as close as possible to original conditions in accordance with Section 32 92 19 GROWTH MEDIA AND SEED.

e. Maximize use of native, non-invasive and/or drought resistant vegetative cover across the site during restoration using a suitable mix of shrubs, grasses, and forbs to preserve biodiversity and related ecosystem services in accordance with Section 32 92 19 GROWTH MEDIA AND SEED.

f. Reuse or recycle recovered materials (for example, metals, asphalt, concrete, etc.) in accordance with this Section herein and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

g. Use onsite or nearby sources of backfill material for excavated areas, if shown to be free of contaminants in accordance with Section 31 23 00 EARTHWORK AND FILL.

h. Install and maintain silt fences and basins to capture sediment runoff along sloped areas in accordance with 01 57 23 TEMPORARY EROSION CONTROL.

i. For landfill covers and other plant-based systems, use organic material such as compost instead of chemical fertilizers to amend the soil in accordance with Section 32 92 19 GROWTH MEDIA AND SEED.

j. Use biodegradable seed matting constructed of recycled materials (for example paper, saw dust, and hay) in accordance with Section 32 92 19 GROWTH MEDIA AND SEED.

k. Recycle as much non-useable/spent equipment and materials as possible following completion of project in accordance with this Section herein and Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

l. Develop an Idling Reduction Plan. During periods of inactivity, idling of diesel onroad vehicles and nonroad equipment shall be minimized. Oregon State law allows the engine of a commercial vehicle to idle for no more than five minutes in a continuous 60-minute period with several exemptions. Idling while waiting to load or unload shall also be limited to five minutes subject only to the exemptions outlined in Oregon state law. The E&R Contractor shall place no-idling signage on site and reinforce no-idling behavior as necessary.

m. Prepare, store, and distribute documents electronically using an environmental information management system.

n. Use local staff (including subcontractors) when possible to minimize resource consumption.

Documentation and implementation of diesel emission control technology is a requirement of the project in accordance with following:

a. Diesel generators used on site for more than 10 total days must be either compliant with EPA Tier 4 nonroad emission standards or be equipped with emission control technology verified by EPA or CARB to reduce PM emissions by a minimum of 85%.

b. All diesel nonroad construction equipment used on site must have engines that meet at least EPA Tier 2 nonroad emission standards.

   At the start of the project, a minimum of 25 percent of all nonroad construction equipment must meet EPA Tier 4 nonroad emission standards or be fitted with emission control technology verified by EPA or CARB for use with nonroad engines to reduce PM emissions by a minimum of 85 percent.

   By the beginning of the second year and thereafter, after the start of on-site clean-up operations, 50 percent of all nonroad construction equipment must meet EPA Tier 4 nonroad emission standards or be fitted with emission control technology verified by EPA or CARB for use with nonroad engines to reduce PM emissions by a minimum of 85 percent.

c. At least 90 percent of diesel onroad vehicles accessing or being used in conjunction with work on the site must have either:

   1. Engines that meet U.S. Environmental Protection Agency (EPA) 2007

onroad engine emissions standards; or

2. Emission control technology verified by EPA or the CARB to reduce PM emissions by a minimum of 85%.

Onroad diesel vehicles, nonroad construction equipment, and generators on site for 10 working days or less over the life of the project are exempt from the emission control technology requirements.

If the E&R Contractor can prove to the RA Construction Manager's satisfaction that for a particular class of onroad diesel vehicle, nonroad construction equipment, or generator, (1) no alternative equipment with a Tier 4 engine is available, (2) it is not technically feasible to meet the control level specified above with a verified device, or (3) installing the control device would create a safety hazard, then the subcontractor, with written approval, may exclude the equipment from the emissions standards.

Independent of this standard, all diesel equipment shall comply with all pertinent local, state, and federal regulations relative to exhaust emissions controls and safety.

All costs associated with the acquisition and installation of emissions control technology are considered incidental to the cost of the project; no additional compensation will be provided.

Small Engines equal to or less than 5 horsepower are not included in this standard and are not required to be reported.

Implementation and tracking of BMPs and Diesel Emission Control Technology shall be documented on monthly tracking sheets to be provided by the RA Construction Manager and summarized upon completion of the project in accordance with Section 01 78 00 Closeout Submittals.

1.8 NOTIFICATION

The RA Construction Manager will notify the E&R Contractor in writing of any observed noncompliance with federal, state, or local environmental laws or regulations, permits, and other elements of the E&R Contractor's Environmental Protection Plan. After receipt of such notice, the E&R Contractor will inform the RA Construction Manager of the proposed corrective action and take such action when approved by the RA Construction Manager. The RA Construction Manager may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or equitable adjustments allowed for any such suspensions. This is in addition to any other actions the RA Construction Manager may take under the contract or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(e)(1) provides that no federal, state, or local

permit will be required for the portion of any remedial action conducted entirely onsite where such remedial action is selected and carried out in compliance with section 121; "onsite" is defined as the aerial extent of contamination and all suitable areas in close proximity to the contamination necessary for implementation of the response action. While permits are not necessary (with the exception of a septic system installation permit), substantive requirements of these permits must still be met. This includes OU1, Parcel H borrow source, ODOT borrow source, and all county roads and access roads between the borrow sources and OU1.

3.2 LAND RESOURCES

Confine all activities to areas defined by the Contract Drawings and Technical Specifications. Identify any land resources to be preserved within the work area prior to the beginning of any construction. Do not remove, cut, deface, injure, or destroy land resources, including trees, shrubs, grasses, topsoil, and land forms, without approval except in areas indicated on the Contract Drawings or specified to be cleared. Ropes, cables, or guys will not be fastened to or attached to any trees for anchorage unless specifically authorized. Provide effective protection for land and vegetation resources at all times, as defined in the following subparagraphs.

3.2.1 Work Area Limits

Mark the areas that need not be disturbed under this contract prior to commencing construction activities. Mark or fence isolated areas within the general work area, which are not to be disturbed. Protect monuments and markers before construction operations commence. If property corner monuments or markers are disturbed during construction activities, replace these monuments or markers in accordance with Section 01 71 23 CONSTRUCTION SURVEYING and in consultation with the Klamath County Surveyor. The E&R Contractor's personnel must be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, grasses, land forms, and other landscape features indicated and defined on the Contract Drawings to be preserved must be clearly identified by marking, fencing, or wrapping with boards or any other approved techniques. Restore landscape features damaged or destroyed during construction operations.

3.2.3 Erosion and Sediment Controls

Providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations, and as described in Section 01 57 23 TEMPORARY EROSION CONTROLS, is the E&R Contractor's responsibility. Select and maintain the erosion and sediment controls for the duration of construction activities. Construct or install temporary and permanent erosion and sediment control using best management practices (BMPs) as indicated on the Contract Drawings and as specified in Section 01 57 23 TEMPORARY EROSION CONTROL. BMPs may include, but not be limited to, straw bales, straw wattles, or temporary diversion ditches. Remove any temporary measures after the area has been stabilized and dispose of in accordance with Section 01 57 23 TEMPORARY EROSION CONTROLS.

3.2.4 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings, as described in Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS or as directed by the RA Construction Manager. Temporary movement or relocation of E&R Contractor facilities will be made only when approved by the RA Construction Manager. Erosion and sediment controls must be provided to mitigate cross-contamination and sediment migration in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION. Temporary excavation and embankments for work areas must be controlled to protect adjacent areas.

3.3 WATER RESOURCES

Visually inspect all areas with surface water that may be affected by construction activities to prevent pollution of surface waters. Do not apply toxic or hazardous chemicals to soil or vegetation. All surface water channels or drainages within or adjacent to OU1 are ephemeral.

3.4 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with all Federal and State air emission and performance laws and standards.

3.4.1 Dust and Particulates

Dust particles, aerosols, and gaseous byproducts from construction activities, must be controlled at all times such that **no visible emissions occur**, including during weekends, holidays, and hours when work is not in progress. Maintain excavations areas, repositories, and other ACM contaminated soil work areas free from particulates (no visible dust emissions). Seal windows and doors of homes within exclusion zone with plastic sheeting prior to excavation work to mitigate possible generation of dust indoors. Water sprinkling, chemical treatment of an approved type, or other methods will be permitted to control particulates in the work area. Water trucks designed for this task or water hoses and sprinklers shall be used. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp **at all times** and may need to be pre-wetted prior to ground disturbing activities. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs.

In accordance with Klamath County Code, Article 81 of the Land Development Code “Mineral and Aggregate Extraction Standards", dust at the Government-furnished borrow sources shall be limited to mitigating nuisance dust.

Dust generated from vehicle operations on borrow access and haul roads shall be controlled in accordance with Section 01 35 12 ROAD MAINTENANCE AND DUST CONTROL.

The RA Contractor Manager shall have the ability to stop work if dust control measures are not maintained.

3.4.2 Odors

Odors from construction activities must be controlled at all times. The odors must be in compliance with state regulations and/or local ordinances and may not constitute a health hazard.

3.4.3 Sound Intrusions

Keep construction activities under surveillance and control to minimize environment damage by noise. Measures to be taken may include, but are not limited to, the following:

a. Use effective intake and exhaust mufflers on all construction equipment.

b. Plan noisier operations during times of highest ambient levels.

c. Keep noise levels at relatively uniform levels; avoid peaks and impulse noises.

d. Turn off idling equipment.

e. Select truck routes so that the noise from haul trucks will have minimal impact on residential areas.

f. Conduct truck loading, unloading, and hauling operations during normal working hours.

3.4.4 Burning

Burning is prohibited. Burning will not be allowed on the project site.

3.5 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes will be as directed below unless otherwise specified in other sections and/or shown on the drawings.

3.5.1 Solid Wastes

Place solid wastes in containers that are emptied on a regular schedule. Handling, storage, and disposal must be conducted to prevent contamination. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with solid waste.

3.5.2 Fuel and Lubricants

Storage, fueling, and lubrication of equipment and motor vehicles must be conducted in a manner that affords the maximum protection against spill and evaporation. Manage and store fuel, lubricants, and oil in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded must be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, and state and local laws and regulations. Storage of fuel on the project site will be in accordance with all Federal, State, and local laws and regulations.

3.6 RECYCLING AND WASTE MINIMIZATION

The E&R Contractor is further encouraged to minimize solid waste generation throughout the duration of the project. Metal obtained during construction activities must be decontaminated (remove visible dirt/clean with decontamination water) prior to recycling.

3.7 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources to be protected within the Contractor's work area are designated on the Contract Drawings (see Sheet C121). Currently identified cultural resources and their protection measures includes a small area in the northern portion of the Swimming Pool repository footprint.

Take precautions to preserve all such resources as they existed at the time they were first encountered. Provide and install protection for these resources and be responsible for their preservation during the life of the contract. This includes the installation of a 5 foot fenced safety buffer around the cultural site. A geotextile, in accordance with Section 02 05 10 MARKER BARRIER GEOTEXTILE, shall be placed over the existing site with no less than 12 inches of clean fill placed on top. Capping of the cultural site shall be monitored by the RA Construction Manager.

3.7.1 Archaeological Discoveries

In the event that unanticipated archaeological discoveries are believed to have been identified during project-related ground disturbance, all work at the location of ground disturbance shall cease immediately and a 30 foot protection radius shall be established, as directed by the RA Construction Manager.

The RA Construction Manager is required to implement an unanticipated discovery protocol that requires consultation with an archaeologist and to develop a mitigation plan. Ground disturbing excavations shall not resume at the location of the discovery until the plan has been implemented and any notification procedures outlined in the plan have occurred.

3.7.2 Native American Burials

In the event that potential Native American burials or an unanticipated discovery of human skeletal remains are identified during project-related ground disturbance, all work in the vicinity of the discovery shall cease immediately. Perform appropriate steps, as directed by the RA Construction Manager, to protect the discovery. Any human skeletal remains that are discovered during the project will be treated with dignity and respect. At minimum, the immediate area will be secured to a minimum distance of 30 feet from the discovery. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. No unauthorized photographs of any human remains shall be taken or distributed.

The RA Construction Manager is required to implement an unanticipated discovery protocol that requires consultation with an archaeologist, in addition to other agencies and organization (e.g., Oregon State Police, the Regional Medical Examiner, SHPO, Commission on Indian Services, and the Klamath Tribes) and to develop a mitigation plan. Ground disturbing excavations shall not resume at the location of the discovery until the plan has been implemented and any notification procedures outlined in the plan have occurred.

3.8 BIOLOGICAL RESOURCES

Minimize interference with, disturbance to, and damage to wildlife and plants, including their habitat. The protection of threatened and endangered animal and plant species, including their habitat, is the Contractor's responsibility in accordance with Federal, State, Regional,

and local laws and regulations.

3.9 PREVIOUSLY USED EQUIPMENT

Clean all previously used construction equipment prior to bringing it onto the project site. Ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds.

3.10 CONTAMINATED SOIL MANAGEMENT

Manage contaminated soils in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

-- End of Section --

SECTION 01 57 23

TEMPORARY EROSION CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

The work shall include the implementation of erosion prevention measures at all work areas as specified in this Section and in conformance with the requirements of Section 01 57 20 ENVIRONMENTAL PROTECTION. This includes furnishing all labor, materials, equipment, and incidentals required for installation, placement, and disposal of all temporary erosion control items. Proper erosion controls are essential to prevent cross-contamination of asbestos-contaminated soils into clean soil areas and to provide a stable soil surface to facilitate revegetation.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

ASTM INTERNATIONAL (ASTM)

ASTM D4873	(2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-05 Design Data

Erosion and Sediment Controls

1.4 EROSION AND SEDIMENT CONTROLS

Submit a plan to provide erosion controls as necessary, as a temporary structural practice to minimize erosion and sediment runoff. Properly install erosion controls to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation of contaminated material and restoration) at each parcel or work zone. Erosion control materials used during excavation of contaminated soil must be disposed in the onsite repositories prior to the commencement of restoration activities. New erosion controls shall be installed during restoration activities to prevent asbestos contaminant migration onto restored areas and to facilitate revegetation. Provide drawings that show areas where erosion controls will be necessary. The RA Construction Manager will approve the final removal of erosion control structures. These erosion control items shall be disposed into the onsite repositories. Provide erosion controls in the following locations or as otherwise directed by the RA Construction Manager:

a. Along the downhill perimeter edge of all areas disturbed

b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas

c. Along the toe of all cut slopes and fill slopes of the construction areas

d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas

e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales

f. At the entrance to culverts that receive runoff from disturbed areas

g. Between areas with contaminated soil and areas that have been restored

h. For slopes steeper than 3H:1V.

1.5 DELIVERY, STORAGE, AND HANDLING

Identify, store, and handle filter fabric in accordance with ASTM D4873.

PART 2 PRODUCTS

2.1 STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. Provide bales with a standard cross section of 14 by 18 inches. Wire-bound or twine-tie all bales. Use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose shall have a minimum dimensions of 1 by 2 inches in cross section and have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 3 feet.

2.2 STRAW WATTLES

Straw wattles, also known as straw worms, bio-logs, straw noodles, or straw tubes are cylinders of compressed, weed free straw (wheat or rice), 8 to 12 inches in diameter and 20 to 25 feet long. Straw wattles shall be encased in jute, nylon, or other photodegradable materials, and have an average weight of 35 pounds. Straw wattles shall be installed in a shallow trench forming a continuous barrier along the contour (across the slope) to intercept water running down a slope.

2.3 SILT FENCE

Silt fence shall consist of approved filter fabric supported on wire mesh fencing having line posts at 10-foot centers and as indicated on the Contract Drawings.

PART 3 EXECUTION

3.1 INSTALLATION OF STRAW BALES

Place the straw bales in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Install straw bales so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. Entrench and backfill the barrier, if necessary. Scatter loose straw over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Securely anchor each bale by at least two stakes (1-inch by 2- inch) driven through the bale at least 6 inches into the ground. Drive the first stake in each bale toward the previously laid bale to force the bales together.

3.2 INSTALLATION OF STRAW WATTLES

Straw wattles shall be installed to capture and retain sediment on slopes, temporarily stabilize slopes by reducing soil creep and sheet and rill erosion until permanent vegetation is established, and isolate restored areas from contaminated soils. Installation procedures include the followings:

a. Layout a contour line on the slope.

b. Dig a shallow depression (about 2 inches deep) and lay the wattle into it.

c. Drive a 1-inch by 2-inch or 2-inch by 2-inch wooden stake through the center of the wattle at least 24 inches into the ground, stopping about two inches above the wattle.

d. Put five stakes in each wattle, installing them end to end in the trench.

e. Seat the wattle with foot-tamped backfill on the upstream side such that water flowing down the slope will not run under it.

3.3 SILT FENCE

Silt fence shall be installed in locations as indicated on the erosion and sediment controls design prior to any clearing or grading activity. Additional silt fence shall be installed as required to meet the requirements of Section 01 57 20 ENVIRONMENTAL PROTECTION or as directed by the RA Construction Manager. Sediment shall be removed from behind the silt fence when it accumulates to one half the exposed geotextile height.

3.4 DIVERSION DIKES (OPTIONAL)

Build diversion dikes with a maximum channel slope of 2 percent and adequately compact to prevent failure. The minimum height measured from the top of the dike to the bottom of the channel shall be 18 inches. The minimum base width shall be 6 feet, and the minimum top width shall be 2 feet. Ensure that the diversion dikes are not damaged by construction operations or traffic.

3.5 SEDIMENT BASINS (OPTIONAL)

Trap sediment in temporary sediment basins. Select a basin size to

accommodate the runoff of a local 10-year storm. Trapped sediment shall be excavated and disposed into the onsite repositories.

3.6 FIELD QUALITY CONTROL

Maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoring destroyed vegetative cover, and repairing erosion and sediment control measures and other protective measures. Use the following procedures to maintain the protective measures.

3.6.1 Straw Bale and Wattle Maintenance

Inspect straw bales and wattles in accordance with Paragraph INSPECTIONS. Pay close attention to the repair of damaged bales and wattles, end runs and undercutting beneath bales and wattles. Accomplish necessary repairs to barriers or replacement of bales and wattles in a prompt manner. Remove sediment deposits when deposits reach one-half of the height of the barrier. At each end of each row turn bales uphill when used to retain sediment. Remove the straw bale barrier(s) and straw wattle(s) when no longer required and dispose of in the onsite repositories. The immediate area occupied by the bales/wattles and any sediment deposits shall be shaped to an acceptable grade.

3.6.2 Diversion Dike Maintenance

Inspect diversion dikes in accordance with Paragraph 3.7 herein. Pay close attention to the repair of damaged diversion dikes and accomplish necessary repairs promptly. When diversion dikes are no longer required, shape to an acceptable grade.

3.7 INSPECTIONS

3.7.1 General

Inspect all erosion control features at least once every 7 calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site.

3.7.2 Inspections Details

Inspect disturbed areas for evidence of, or the potential for, pollutants entering the drainage system. Observe erosion and sediment control measures identified in the Environmental Protection Plan to ensure they are operating correctly. Inspect discharge locations or points to ascertain whether erosion control measures are effective in preventing discharge offsite. Inspect locations where vehicles exit the site for evidence of offsite sediment tracking.

3.7.3 Inspection Reports

For each inspection conducted, prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Environmental Protection Plan, maintenance performed, and actions taken. A copy of the inspection report shall be maintained on the job site.

3.8 DISPOSAL OF USED EROSION CONTROLS

Erosion controls used within the exclusion zone or in contaminated with asbestos contaminated soils shall be disposed of in the onsite repository. Erosion controls used at the borrow source locations or for restoration activities shall be disposed of at an approved offsite location.

-- End of Section --

SECTION 01 58 13

TEMPORARY SIGNAGE

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include furnishing all labor, materials, equipment, and incidentals required for the installation of temporary asbestos warning signage at the North Ridge Estates Site. Temporary signage shall only be required while the asbestos repositories remain active and between construction seasons. These signs shall be removed once the permanent frost protective cap is installed on the repositories.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.145	Accident Prevention Signs and Tags
40 CFR 763	Asbestos

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Temporary Repository Signage

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the site in an undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact. Materials shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 TEMPORARY REPOSITORY SIGNAGE

Submit electronic format deliverable that indicates the size, text, and message of the sign, including any graphics. All exterior signage shall be provided by a single manufacturer. Exterior signage shall be of the design, detail, sizes, types, and message content shown below; conform to the requirements specified; and, be provided at the locations indicated. Signs shall be complete with lettering, framing as detailed, and related components for a complete installation.

Display the following legend in the lower panel with letter sizes and styles of a visibility at least equal to those specified in accordance with 40 CFR 763, Subpart E.

Legend	**Notation**
Asbestos Waste Disposal Site.	1 inch Sans Serif, Gothic or Block
Do Not Create Dust.	3/4 inch Sans Serif, Gothic or Block
Breathing Asbestos is Hazardous to Your Health.	14 Point Gothic

Spacing between any two lines must be at least equal to the height of the upper of the two lines.

Conform to the requirements for 20-inch by 14-inch upright format signs specified in 29 CFR 1910.145(d)(4).

PART 3 EXECUTION

3.1 SIGNAGE INSTALLATION

No work shall be performed until site utilities have been field located. When installing signage, take the necessary precautions to ensure no damage occurs to existing structures and utilities. Damage to existing structures and utilities resulting from the E&R Contractor's operations shall be repaired at no additional cost to the RA Construction Manager.

Signs shall be installed in accordance with approved manufacturer's instructions and shall be displayed at all repository entrances and at intervals of approximately 330 feet or less along the property line or perimeter of the sections of the site where asbestos-containing waste material was deposited. Signs shall be installed plumb and true at mounting heights indicated and by method shown or specified.

Anchorage and fastener materials shall be in accordance with approved manufacturer's instructions. Complete an 8-inch diameter augured post hole a minimum of 3 feet deep to receive the sign post. Where rock is encountered and cannot be augured or excavated to the required depth, the rock may be drilled to accept the vertical reinforcing steel and anchor bolts that shall be grouted in place.

-- End of Section --

SECTION 01 71 23

CONSTRUCTION SURVEYING

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the following requirements:

a. Furnish all labor, materials, equipment, and incidentals required to provide survey services prior to, during, and after work completion.

b. Verify the existing conditions, contours, and location of structures within the construction limits defined on the Contract Drawings.

c. All work shall be referenced to and established from the survey control points as shown on the Contract Drawings, re-established where necessary, and maintained throughout the life of the contract. Any error or apparent discrepancies found on the Contract Drawings or other Sections shall be called to the RA Construction Manager's attention for interpretation prior to proceeding with the work.

d. Perform surveys for layout of the work, to obtain data for progress quantity surveys, and to verify excavation and restoration quantities for payment of completed work as described in Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED SOIL and Section 31 23 00 EARTHWORK AND FILL.

e. Prepare As-Built Drawings which will detail the actual conditions of surface and subsurface construction, contours, and location of site features if different than from initial survey, upon the completion of work each season as described in Section 01 78 00 CLOSEOUT SUBMITTALS.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

OREGON REVISED STATUTES (O.R.S)

ORS 209.250	Survey by registered land surveyor; requirements for map, narrative or report of survey; waiver of required filing; effect of noncompliance

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Surveyor Qualifications

Name, address, Oregon Professional Land Surveyor registration number, and telephone number of the surveyor shall be submitted before starting survey work.

Surveyor Field Notes

Copies of the surveyor's field notes, calculations, and graphical layouts.

SD-05 Design Data

Quantity Survey; G

Survey work performed to document measurement of quantities for payment request in accordance with Section 01 27 00 MEASUREMENT AND PAYMENT.

1.4 QUALITY CONTROL

All control surveys for elevation shall be ±0.1 foot and, for horizontal, control angles shall be to the nearest 20 seconds ±10 seconds; measured distances shall be to ±0.01 foot. All measurement surveys for elevation shall be to the nearest 0.01 foot and for horizontal distances shall be to ± 0.01 foot for monuments and 0.1 foot for ground shots.

Provide all materials as required to properly perform the surveys, including, but not limited to, instruments, tapes, rods, measures, mounts and tripods, stakes and hubs, nails, ribbons, other reference markers, and all else as required. All material shall be of good professional quality and condition.

All lasers, transits, and other instruments shall be calibrated and maintained in accurate calibration throughout the execution of the work.

Furnish all materials and accessories (i.e., grade markers, stakes, pins, spikes, etc.) required for the proper location of grade points and line.

All marks given shall be carefully preserved and, if destroyed or removed without the RA Construction Manager's approval, they shall be reset, if necessary, at the E&R Contractor's expense.

The final coordinates reported shall use the State Plane Coordinate System, Oregon South Zone State Plane North American Datum (NAD) 83 International Foot. Elevation surveys shall use the North American Vertical Datum of 1988, US Survey Foot.

1.5 Surveyor Qualifications

The surveyor shall be a licensed Oregon Professional Land Surveyor. The E&R Contractor's surveyor shall also have a minimum of 2 years of experience in construction surveying and layout and maintenance of as-built construction drawings, with a record of performing horizontal and vertical control requirements as stated in this section.

1.6 PROJECT AS-BUILT DOCUMENTS

Upon seasonal completion of fieldwork, furnish the RA Construction Manager with originals of all surveyor field notes, computations, any records relating to the quantity survey or to the layout of the work. Perform any

necessary surveys to update as-built drawings and produce final records to the RA Construction Manager in accordance with Section 01 78 00 CLOSEOUT SUBMITTALS.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 INSPECTION

Verify locations of site reference and survey control points prior to starting work. The RA Construction Manager must be notified within 24 hours of acknowledgement of any discrepancies discovered.

3.2 SURVEY CONTROL POINTS

All monumentation for survey control points shall be in accordance with the minimum requirements of § ORS 209.250.

Determine the reference points for the site. Take all reasonable measures to protect site reference points prior to construction activities. Reference points shall not be relocated without prior written approval of the RA Construction Manager.

Temporary monuments shall be set as necessary to perform the surveying. They may be wood, metal, or marks scribed on permanent site features. All monuments shall be described in the field notes and marked on site maps for future reference.

Within 24 hours of acknowledgement, report to the RA Construction Manager the loss, damage, destruction, or relocation of any other reference/control points or property corners. Replace dislocated control points and/or property corners based on original survey control at no additional cost to the RA Construction Manager in accordance with the minimum requirements of § ORS 209.250. Replacement of dislocated control points shall be done by a qualified Oregon Professional Land Surveyor. Survey accuracy used to relocate disturbed control points shall be equal to or better than that with which the original control was set.

3.3 SURVEY WORK

Minimize any disturbance to existing property and to the landscape in the areas surrounding the work site. Ensure survey crews limit their work to within the project site boundaries as defined on the Contract Drawings. Surveys shall include, but not be limited to, the following:

a. An initial inspection.

b. Surveys to establish new benchmarks.

c. Surveys to reestablish destroyed or damaged survey control points.

d. Surveys to reestablish destroyed or damaged monuments. The registered professional land surveyors making a survey pursuant to ORS 209.250 shall submit for filing a complete record that contains all the elements listed in ORS 209.250(2)(3) within 45 days of establishment or reestablishment of any boundary monument or boundary reference

monument. The 45-day limit will commence with the setting of the first monument, not the completion of the project.

e. Other surveys indicated or implied by these specifications or necessary to document pre-excavation grades and final grades for payment quantities (i.e., quantity surveys) as described in Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL and Section 31 23 00 EARTHWORK AND FILL. Any surveys necessary to correct defects in the survey work shall be performed by the E&R Contractor at no additional cost to the RA Construction Manager.

These quantity survey requirements include, but are not limited to:

1. Surveys performed immediately prior to and after excavation of contaminated soil material to determine the volume of contaminated soil excavated. Provide cross-sections on 25-foot intervals and at grade break points for all excavated areas.

2. Surveys performed immediately prior to and after excavation of borrow material to determine the volume of borrow material excavated. Provide cross-sections on 25-foot intervals and at grade break points for all excavated areas.

3. Surveys performed immediately after placement, grading, and compaction of subsoil to determine the cubic yards of compacted subsoil placed. Provide cross-sections on 25-foot intervals and at grade break points for all excavated areas.

4. Surveys performed immediately after placement and grading of growth media to determine the cubic yards of subsoil placed. Provide cross-sections on 25-foot intervals and at grade break points for all excavated areas.

5. Surveys performed immediately prior to and after placement and grading temporary subsoil cover at repositories to determine the cubic yards of subsoil placed. Provide cross-sections on 25-foot intervals and at grade break points for all excavated areas.

6. Surveys performed immediately prior to and after placement, and grading, and compaction of the permanent soil cover at repositories to determine the cubic yards of cover soil placed. Provide cross-sections on 25-foot intervals and at grade break points for all excavated areas.

7. Surveys performed of borrow source areas prepared.

8. Surveys performed of areas of marker barrier installed.

f. Surveys required to capture, at a minimum, as-built surface features such as elevation and grade of restored surfaces and site features including onsite repositories and subsurface features including contamination left-in-place, drainage improvements, and site utilities. Include the legal description on each parcel specific as-built drawing, as well as the legal description of the extent of excavation if limited to only a portion of a parcel. As-built drawings shall be completed such that each parcel is shown as a single drawing.

-- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the preparation, update, submittal and revision of the closeout documents, including as-built drawings, and seasonal closure reports.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

As-Built Drawings; G
Seasonal Closure Reports; G

1.3 PROJECT AS-BUILT DOCUMENTS

1.3.1 As-Built Drawings

Submit drawings showing final as-built conditions of the project. Contract Drawings will be used as the basis for as-built drawings showing as-built conditions and will be provided by the RA Construction Manager. The final Computer-Aided Design and Drafting (CADD) as-built drawings must consist of two sets of electronic CADD drawing files in the specified format and two paper copies of 11-inch x 17-inch sets.

1.3.1.1 RA Construction Manager Furnished Materials

One set of electronic CADD files in the specified software and format revised to reflect all bid amendments will be provided by the RA Construction Manager at the Pre-Construction Conference for projects requiring CADD file as-built drawings.

1.3.1.2 Working As-Built and Final As-Built Drawings

On a monthly basis, revise two sets of paper drawings by red-line process to show the parcel specific as-built conditions during the execution of the project. Maintain one set of working as-built drawings available on the job site at all times. Changes from the Contract Drawings or additional information identified during the course of construction shall be accurately recorded.

Prepare final as-built drawings after completion of each construction season. The working as-built marked prints and final as-built drawings will be jointly reviewed for accuracy and completeness by the RA Construction Manager and the E&R Contractor prior to submission. Show on the working and final as-built drawings, but not limited to, the following information:

a. Correct grade, elevations, and cross section of earthwork, including frost protective cap construction grades and contaminated material

repositories (grade each season, final grade, and frost protective cap). Provide detailed information/explanations if any changes were made from Contract Drawings. Identify visible contamination left-in-place and extent/depth of marker barriers.

b. Correct location of all surface and subsurface site features and indicate if these features are different from original plans.

c. The topography and grades of all drainage affected or altered as part of the project construction.

d. Include legal description of each parcel, as well as legal description of the extent of excavation if excavation limited to only a portion of the parcel.

e. Features designed or enhanced by the E&R Contractor.

f. Miscellaneous changes or modifications from the original design and layout of work or changes or modifications that result from the final inspection.

1.3.1.3 Drawing Preparation

Modify the as-built drawings as may be necessary to correctly show the features of the project as it has been constructed by bringing the Contract Drawings into agreement with approved working as-built prints, and adding such additional drawings as may be necessary. These working as-built marked prints must be neat, legible, and accurate. These drawings are part of the permanent record of this project and must be returned to the RA Construction Manager. Any drawings damaged or lost by the E&R Contractor must be satisfactorily replaced by the E&R Contractor at no expense to the RA Construction Manager.

1.3.1.4 Computer Aided Design and Drafting (CADD) Drawings

Employ only personnel proficient in the preparation of CADD drawings to modify the Contract Drawings or prepare additional new drawings. Additions and corrections to the Contract Drawings must be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols must be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, prepare them using the specified electronic file format, applying the same graphic standards specified in original drawings. Graphic standards will be provided by the RA Construction Manager. The title block and drawing border to be used for any new final as-built drawings must be identical to that used on the Contract Drawings. Accomplish additions and corrections to the Contract Drawings using CADD files. The E&R Contractor will be furnished "as-designed" drawings in AutoCAD Release 2014 format compatible with a Windows operating system. The electronic files will be supplied on compact disc, read-only memory (CD-ROM or DVD). The RA Construction Manager will review final as-built drawings for accuracy and return them to the Contractor for required corrections, changes, additions, and deletions.

a. Provide CADD "base" colors of red, green, and blue. Color code for changes as follows:

1. Deletions (Red) - Over-strike deleted graphic items (lines),

lettering in notes, and leaders.

2. Additions (Green) - Added items, lettering in notes, and leaders.

3. Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

b. Rename the Contract Drawing files in a manner related to the contract number as instructed in the Pre-Construction Conference. Use only those renamed files for the Marked-up changes. All changes shall be made on the layer/level as the original item.

c. When final revisions have been completed, show the wording "AS-BUILT DRAWINGS" followed by the name of the E&R Contractor in letters at least 3/16 inch high on the cover sheet drawing. Mark all other contract drawings either "As-Built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. Date revised as-built drawings with a new date in the revision block.

d. Within 20 days after RA Construction Manager approval of all of the working as-built drawings for a phase of work, prepare the final CADD as-built drawings for each season of work completed and submit these drawings for RA Construction Manager's review and approval. The RA Construction Manager will return the drawings annotated with any necessary corrections. Within 10 days, revise the CADD files accordingly at no additional cost and submit final drawings to the RA Construction Manager. Submit electronic files on compact disc of the approved working as-built drawings. They must be complete in all details and identical in form and function to the Contract Drawing files supplied by the RA Construction Manager. Any adjustments necessary to accomplish this are the responsibility of the E&R Contractor. Failure to submit final as-built drawing files and marked prints as specified will be cause for withholding any payment due the E&R Contractor under this contract. Approval and acceptance of final as-built drawings must be accomplished before final payment is made to the E&R Contractor.

1.4 SEASONAL CLOSURE REPORTS

Electronic copies of the Seasonal Closure Reports shall be prepared and submitted within 30 calendar days of completing work each season at the site. The report shall be labeled with the contract number, project name, location, date, and name of Contractor. The purpose of the Season Closure Report is to supplement the as-built drawings and provide a means of summarizing the other pertinent information and data obtained during execution of the RA. The Seasonal Closure Report shall include the following information as a minimum:

a. A cover letter signed by a responsible company official certifying that all services involved have been performed in accordance with the terms and conditions of the contract documents and regulatory requirements.

b. A narrative report, including, but not limited to, the following:

1. Site conditions and cleanup criteria

2. Visual inspection observations

3. Quantity of contaminated soils excavated on a parcel basis

4. Quantity of borrow source materials excavated and processed

5. Quantity and types of materials imported from off-site

6. Quantity of other restoration materials used

7. Summary of as-built materials that include, but is not limited to, product data of installed materials such as septic systems, repaired utilities, seed mixes, geomembrane or geotextile vendor, and material type, gravel type and source, and concrete and asphalt mixes. In addition, document record of maintenance work performed, measurements and findings for product failure, recommendations for repair, and products replaced during remedial action (RA). This includes records of watering vegetated areas and types, locations, amounts, and dates when herbicides were used. This information shall consist of a compilation of approved submittals as a combined package.

8. Summary of monthly metric tracking of green remediation requirements.

9. Descriptions of unanticipated events

10. Change orders/amendments

11. Incident reports

c. Color photographs shall be used to document progress of the work. A minimum of four views of the site showing the location of the area of contamination and any other notable site conditions shall be taken before work begins, and notes shall indicate where photographs were taken. After work has been started, activities at each work location shall be photographically recorded daily. Photographs shall include, but are not limited to:

1. Date, time, and location of photograph.

2. Soil excavation, including excavation work around tree roots.

3. Unanticipated events such as the discovery of additional contaminated material.

4. Fill placement and grading.

5. Post-construction photographs. After completion of work at each site, take a minimum of four views of each excavation site.

A digital version of all photos shown in the report shall be included with the Seasonal Closure Report.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

(NOT USED)

-- End of Section --

SECTION 02 05 10

MARKER BARRIER GEOTEXTILE

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the procurement and installation of geotextile materials for the marker barrier as indicated in the Contract Drawings. The work includes all necessary site preparation, furnishing, and installing geotextile materials, and any incidental work required.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 288	(2006) Standard Specification for Geotextile Specification for Highway Applications

ASTM INTERNATIONAL (ASTM)

ASTM D 3786	(2009) Standard Test Method for Bursting Strength of Textile Fabrics - Diaphragm Bursting Strength Tester Method
ASTM D 4355	(2007) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D 4491	(1999a; R 2009) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(2011) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(2011) Determining the Specification Conformance of Geosynthetics
ASTM D 4833	(2007) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

ASTM D 5261	(2010) Standard Test Method for Measuring Mass per Unit Area of Geotextiles
ASTM D 6241	(2004; R 2009) Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

High Visibility Orange (HVO) Geotextile

SD-06 Test Reports

Manufacturing Quality Control Sampling and Testing

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle geotextile in accordance with ASTM D 4873.

1.4.1 Delivery

The RA Construction Manager and E&R Contractor shall be present during delivery and unloading of geotextile rolls packaged in an opaque, waterproof, protective plastic wrapping. The plastic wrapping shall not be removed until deployment. Geotextile or plastic wrapping damaged during storage or handling shall be repaired or replaced, as directed by the RA Construction Manager. Label each roll with the manufacturer's name, geotextile type, roll number, roll dimensions (length, width, gross weight), and date manufactured. Damaged geotextile shall be removed from the site and replaced with geotextile that meets the specified requirements at no expense to the RA Construction Manager.

1.4.2 Storage

Protect rolls of geotextile from construction equipment, chemicals, sparks and flames, temperatures in excess of 160 degrees F, or any other environmental condition that may damage the physical properties of the geotextile. To protect geotextile from becoming saturated, either elevate rolls off the ground or place them on a sacrificial sheet of plastic in an area where water will not accumulate.

1.4.3 Handling

Handle and unload geotextile rolls with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Rolls shall not be dragged along the ground, lifted by one end, or dropped to the ground.

PART 2 PRODUCTS

2.1 MATERIALS

A minimum of 7 days prior to scheduled use, submit manufacturer's certificate of compliance stating that the geotextile meets the requirements of this section.

2.1.1 High Visibility Orange (HVO) Geotextile

Provide geotextile that is a nonwoven, needle-punched, orange warning barrier geotextile that satisfies the requirements outlined in AASHTO M 288 for Class 2 applications.

Geotextiles shall meet the requirements specified in Table 1. Where applicable, Table 1 property values represent minimum average roll values (MARV) in the weakest principal direction. Values for apparent opening size (AOS) represent maximum average roll values.

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR HVO GEOTEXTILE

PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
WEIGHT - TYPICAL	OUNCE/SY	6.0	ASTM D 5261
TENSILE STRENGTH	LBS	160	ASTM D 4632
ELONGATION @ BREAK	%	50	ASTM D 4632
MULLEN BURST	PSI	305	ASTM D 3786
PUNCTURE STRENGTH	LBS	90	ASTM D 4833
CBR PUNCTURE	LBS	410	ASTM D 6241
TRAPEZOIDAL TEAR	LBS	60	ASTM D 4533
APPARENT OPENING SIZE	US SIEVE	70	ASTM D 4751
PERMITTIVITY	SEC-1	1.5	ASTM D 4491
WATER FLOW RATE	G/MIN/SF	110	ASTM D 4491
UV RESISTANCE @ 500 HOURS	%	70	ASTM D 4355

2.2 MANUFACTURING QUALITY CONTROL SAMPLING AND TESTING

Perform manufacturing quality control sampling and testing at a frequency of one test per roll in accordance with the manufacturer's approved quality control manual. Acceptance of geotextile shall be in accordance with ASTM D 4759. Tests not meeting the specified requirements will result in the rejection of applicable rolls.

PART 3 EXECUTION

3.1 INSTALLATION

Geotextile shall be installed as a marker barrier as follows:

a. Visible ACM Left-In-Place: In accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED SOIL, visible ACM below 4 feet below ground surface (bgs) shall be left-in-place as directed by the RA Construction Manager. Geotextile shall be installed above contamination left-in-place as part of a two-layer system as shown in the Contract Drawings and in accordance with Section 31 23 00 EARTHWORK AND FILL.

b. Onsite Repositories: As shown in the Contract Drawings, geotextile shall be installed as a marker barrier between the consolidated contaminated soil and frost protective cap. This included the former landfill area.

3.2 GEOTEXTILE PLACEMENT

Geotextile rolls that are damaged or contain imperfections shall be repaired or replaced as directed by the RA Construction Manager. The geotextile shall be free of tensile stresses, folds, and wrinkles. On slopes steeper than 10 horizontal on 1 vertical, lay the geotextile with the machine direction of the fabric parallel to the slope direction.

3.3 FIELD SEAMS

Continuously overlap geotextile panels a minimum of 12 inches at all longitudinal and transverse joints. Where seams must be oriented across the slope, lap the upper panel over the lower panel. Pins, staples, or other mechanical fasteners may be used to keep panels in place.

3.4 PROTECTION

Protect the geotextile during installation from tears and other damage. Damaged geotextile shall be repaired or replaced as directed by the RA Construction Manager. Use adequate ballast (e.g. sand bags) to prevent uplift by wind. The geotextile shall not be left uncovered for more than 14 days after installation.

3.5 DEFECTS AND REPAIRS

Repair or replace torn or damaged geotextile. Perform repairs by placing a patch of the same type of geotextile over the damaged area. The patch shall extend a minimum of 12 inches beyond the edge of the damaged area and be pinned in place. Remove and replace geotextile rolls that cannot be repaired. Repairs shall be performed at no additional cost to the RA Construction Manager.

3.6 VISUAL INSPECTION AND EVALUATION

The geotextile, seams, and overlaps shall be visually inspected by the E&R Contractor and RA Construction Manager for defects, holes, or damage due to weather conditions or construction activities. At the RA Construction Manager's discretion, the surface of the geomembrane shall be brushed, blown, or washed by the E&R Contractor if the amount of dust, mud, or foreign material inhibits inspection or functioning of the overlying

material.

3.7 COVERING

Geotextile shall not be covered prior to inspection and approval by the RA Construction Manager. Place cover soil in a manner that prevents soil from entering the geotextile overlap zone, prevents tensile stress from being mobilized in the geotextile, and prevents wrinkles from folding over onto themselves. On side slopes, soil backfill shall be placed from the bottom of the slope upward. Cover soil shall not be dropped onto the geotextile from a height greater than 3 feet. No equipment shall be operated directly on top of the geotextile without approval of the RA Construction Manager. Use equipment with ground pressures less than 7 pounds per square inch (psi) to place the first lift over the geotextile. A minimum of 12 inches of soil shall be maintained between full-scale construction equipment and the geotextile. Cover soil material type, compaction, and testing requirements are described in Section 31 23 00 EARTHWORK AND FILL. Equipment placing cover soil shall not stop abruptly, make sharp turns, spin their wheels, or travel at speeds exceeding 5 miles per hour (mph).

-- End of Section --

SECTION 02 05 20

WASTE CONTAINMENT GEOMEMBRANE

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the procurement and installation of geomembrane materials for work to cover contaminated soil under covered decks and in crawlspaces as shown on the Contract Drawings. The work includes all necessary site preparation, furnishing and installing geomembrane materials, and any incidental work required.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

ASTM INTERNATIONAL (ASTM)

ASTM D 751	(2006; R 2011) Coated Fabrics
ASTM D 1004	(2009) Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 1203	(2010) Volatile Loss from Plastics Using Activated Carbon Methods
ASTM D 1204	(2008) Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature
ASTM D 4833	(2007) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples
ASTM D 6693	(2004; R 2010) Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
ASTM E 96	(2010) Standard Test Methods for Water Vapor Transmission of Materials

GEOSYNTHETIC INSTITUTE (GSI)

GSI GRI GM7	(1995) Accelerated Curing of Geomembrane Test Strip Seams Made by Chemical Fusion Methods

GSI GRI GM9 (1995) Cold Weather Seaming of Geomembranes

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Field Seams
Geomembrane

SD-06 Test Reports

Manufacturing Quality Control Sampling and Testing

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle geotextile in accordance with ASTM D 4873.

1.4.1 Delivery

The RA Construction Manager and E&R Contractor shall be present during delivery and unloading of the geomembrane. Each geomembrane roll/panel shall be labeled with the manufacturer's name, product identification number, roll/panel number, and roll dimensions. Damaged geomembrane shall be removed from the site and replaced at no expense to the RA Construction Manager.

1.4.2 Storage

Temporary storage at the project site shall be on a level surface, free of sharp objects where water cannot accumulate. The geomembrane shall be protected from puncture, abrasion, excessive heat or cold, material degradation, or other damaging circumstances. Storage shall not result in crushing the core of roll goods or flattening of the rolls. Rolls shall not be stored more than two high. Palleted materials shall be stored on level surfaces and shall not be stacked on top of one another. Ultraviolet sensitive materials (i.e., polyvinyl chloride [PVC]) shall be covered with a sacrificial opaque and waterproof covering or placed in a temporary shelter.

1.4.3 Handling

Rolls/panels shall not be dragged, lifted by one end, or dropped.

1.5 AMBIENT CONDITIONS

Geomembrane shall not be deployed or field-seamed in the presence of excess moisture (i.e., rain, fog, dew), in areas of ponded water, or in the presence of excess wind. Unless authorized by the RA Construction Manager, no placement or seaming shall be attempted at ambient temperatures below 32 degrees F or above 104 degrees F. Ambient temperature shall be measured at a height no greater than 6 inches above the ground or geomembrane surface. If seaming is allowed below 32 degrees F, the procedures outlined in GSI GRI GM9 shall be followed.

PART 2 PRODUCTS

2.1 GEOMEMBRANE

2.1.1 Raw Materials

Resin used in manufacturing geomembrane sheets shall be made of virgin uncontaminated ingredients. No more than 10 percent regrind, reworked, or trim material in the form of chips or edge strips shall be used to manufacture the geomembrane sheets. All regrind, reworked, or trim materials shall be from the same manufacturer and exactly the same formulation as the geomembrane sheet being produced. No post-consumer materials or water-soluble ingredients shall be used to produce the geomembrane. Submit a copy of the test reports and quality control (QC) certificates for materials used in the manufacturing of the geomembrane shipped to the site.

2.1.2 Sheet Materials

Geomembrane sheets shall be unreinforced and manufactured as wide as possible to minimize factory and field seams. Geomembrane sheets shall be uniform in color, thickness, and surface texture. The sheets shall be free of and resistant to fungal or bacterial attack and free of cuts, abrasions, holes, blisters, contaminants and other imperfections. Geomembrane sheets shall conform to the requirements listed in Table 1 for Manufacturing Quality Control (MQC).

TABLE 1 - SMOOTH MDPE GEOMEMBRANE PROPERTIES

PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
APPEARANCE	COLOR	BLACK	
THICKNESS, NOMINAL	MIL	20	
WEIGHT	LBS/MSF	93	
*TENSILE STRENGTH LBF/IN	LBF	75	ASTM D 6693
*ELONGATION AT BREAK	%	800	ASTM D 6693
*TEAR RESISTANCE	LBF	11	ASTM D 1004
MULLEN BURST	PSI	100	ASTM D 751
PUNCTURE RESISTANCE	LBF	30	ASTM D 4833
VOLATILE LOSS	%	< 1	ASTM D 1203

TABLE 1 - SMOOTH MDPE GEOMEMBRANE PROPERTIES			
PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
DIMENSIONAL STABILITY	%	< 2	ASTM D 1204
MAXIMUM USE TEMPERATURE	DEG F	180	
MINIMUM USE TEMPERATURE	DEG F	-70	
PERMEABILITY	"PERMS" = GRAINS/ (FT2xHRxINxHg)	0.041	ASTM E 96, METHOD A

2.2 MANUFACTURING QUALITY CONTROL SAMPLING AND TESTING

2.2.1 Raw Materials

Raw materials shall be tested by the manufacturer in accordance with the approved MQC manual. Any raw material that fails to meet the geomembrane manufacturer's specified physical properties shall not be used in manufacturing the sheet. Seaming rods and pellets shall be manufactured of materials that are essentially identical to that used in the geomembrane sheet. Seaming rods and pellets shall be tested by the manufacturer for density, melt index, and carbon black content in accordance with the approved MQC manual. Seaming rods and pellets that fail to meet the corresponding property values required for the sheet material shall not be used for seaming.

2.2.2 Sheet Material

Geomembrane sheets shall be tested at a frequency of one test per roll in accordance with the approved MQC manual. Sheets not meeting the minimum requirements specified in Table 1 shall not be sent to the site.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Subsurface Preparation

Rocks larger than 1 inch in diameter and any other material that could damage the geomembrane shall be removed from the surface to be covered with the geomembrane.

Rat feces may exist in the crawlspaces of the unoccupied houses that require a crawlspace liner. Rat feces shall be carefully removed and the crawlspace area disinfected in accordance with health and safety requirements identified in the approved Health and Safety Plan and disposed of at an approved offsite location. Once the crawlspace is cleared of rat feces, the liner shall be installed.

3.1.2 Anchor Trenches (Under Covered Decks Only)

The anchor trench shall be 12 inches deep and 12 inches wide. Ponded water shall be removed from the anchor trench while the trench is open.

Trench corners shall be slightly rounded to avoid sharp bends in the geomembrane. Loose soil, rocks larger than 1 inch in diameter, and any other material that could damage the geomembrane shall be removed from the surfaces of the trench. The geomembrane shall extend down the front wall and across the bottom of the anchor trench. Backfilling and compaction of the anchor trench shall be in accordance with Section 31 23 00 EARTHWORK AND FILL.

3.2 GEOMEMBRANE PLACEMENT

The procedures and equipment used shall not elongate, wrinkle, scratch, or otherwise damage the geomembrane, other geosynthetic layers, or the underlying subgrade. Geomembrane damaged during installation shall be replaced or repaired, at the RA Construction Manager's discretion. Only geomembrane panels that can be anchored in the same day shall be deployed. Adequate ballast (i.e., sand bags) shall be placed on the geomembrane without damaging the geomembrane to prevent uplift by wind. Seams shall be oriented parallel to the line of maximum slope. Where seams can only be oriented across the slope, the upper panel shall be lapped over the lower panel. The geomembrane shall have adequate slack to prevent the creation of tensile stress. The wrinkle height to width ratio for installed geomembrane shall not exceed 0.5. In addition, geomembrane wrinkles shall not exceed 6 inches in height. For covered deck application, cover geomembrane liner with a 2 inch thick gravel cover as indicated on the Contract Drawings.

3.3 FIELD SEAMS

3.3.1 Field Seams

Panels shall be seamed in accordance with the geomembrane manufacturer's recommendations. In sumps, corners and odd-shaped geometric locations, the number of field seams shall be minimized. Seaming shall extend to the outside edge of panels. The seam area shall be free of moisture, dust, dirt, and foreign material at the time of seaming. Fish mouths (i.e., folds along seam) shall be repaired.

3.3.1.1 Non-Polyethylene Seams

Non-polyethylene geomembranes shall be seamed by methods as recommended by the geomembrane manufacturer. Seaming adhesives, solvents, or chemical cleaning agents shall be stored away from the geomembrane and only spill-resistant containers shall be used while working on the geomembrane. If low temperatures slow the curing process of chemically fused seams and delay seam testing, GSI GRI GM7 shall be used to accelerate sample curing.

3.4 DEFECTS AND REPAIRS

3.4.1 Patches

Tears, holes, blisters, and other defects shall be repaired with patches. Patches shall have rounded corners, be made of the same geomembrane, and extend a minimum of 6 inches beyond the edge of defects. Minor localized flaws shall be repaired by seaming as determined by the RA Construction Manager.

3.5 VISUAL INSPECTION AND EVALUATION

The geomembrane, seams, and non-seam areas shall be visually inspected by the E&R Contractor and RA Construction Manager for defects, holes, or damage due to weather conditions or construction activities. At the RA Construction Manager's discretion, the surface of the geomembrane shall be brushed, blown, or washed by the installer if the amount of dust, mud, or foreign material inhibits inspection or functioning of the overlying material.

-- End of Section --

Section 02 41 00

DEMOLITION AND RESTORATION OF SITE FEATURES

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall consist of demolishing, segregating, hauling, and disposing (or recycling) of site features at an approved offsite site facility, as indicated on the Contract Drawings. If ACM is identified within these structures, it shall be wetted, dismantled, and disposed of in the onsite repositories. If materials are in contact with contaminated soil, wash off soils before offsite disposal. This work item shall also include the return or replacement of site features that were demolished or relocated.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 763 Asbestos

OREGON BUILDING CODE (OBC)

OESC (2011) Oregon Electrical Specialty Code

OPSC (2011) Oregon Plumbing Specialty Code

ORSC (2011) Oregon Residential Specialty Code

OREGON FIRE CODE (OFC)

OFC (2010) Oregon Fire Code

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

General Demolition Plan (and Asbestos-Containing Material Survey); G

Submit no later than 30 days after receipt of Notice to Proceed.

Septic System Installation Plans; G

Submit no later than 30 days after receipt of Notice to Proceed.

SD-02 Shop Drawings

Septic System; G

Include shop drawings with each septic system installation plan for each parcel.

Replacement Deck Design; G

Include shop drawings for each proposed deck to be replaced.

SD-03 Product Data

Septic System Installer Qualifications

Name, address, and Oregon septic system installer license number shall be submitted before starting installation work.

SD-05 Design Data

Existing Conditions Survey of Features to be Protected; G

Submit no later than 5 days prior to establishment of work zone boundaries.

SD-07 Certificates

Certificate of Satisfactory Completion

AHERA Certified Asbestos Inspector

1.4 DEFINITIONS

The following paragraphs provide definition of the terms used to describe the demolition of existing site features at each property, as shown on the Contract Drawings. The RA Construction Manager shall coordinate with the property owners prior to the demolition work to confirm future use of existing site features.

1.4.1 Remove

Site features identified to be removed shall be demolished, segregated, and disposed of or recycled at an approved offsite facility. If site features are in contact with contaminated soil, wash off soils before offsite disposal. Concrete shall be handled as described in Paragraph 3.2.1 herein.

1.4.2 Remove and Replace

Site features identified to be removed and replaced shall be demolished, segregated, and disposed of or recycled at an approved offsite facility. If site features are in contact with contaminated soil, wash off soils before offsite disposal. Removed site features will be replaced as indicated on the Contract Drawings to their original location, unless otherwise directed by the RA Construction Manager. Removed site features will be replaced in kind with new material to meet current Klamath County building code standards. Concrete shall be handled as described in Paragraph 3.2.1 herein.

1.4.3 Relocate and Return

Site features identified to be relocated and returned shall be carefully dismantled, washed, and set outside the exclusion zone in a secure area until the excavation of contaminated material and restoration work has been completed. The E&R Contractor shall be responsible for lost or stolen property. During site restoration activities, the relocated features shall be carefully returned and/or reinstalled to their original location and functioning service (or equal to existing functioning/non-functioning service), unless otherwise directed by the RA Construction Manager.

1.5 GENERAL DEMOLITION PLAN (AND ASBESTOS-CONTAINING MATERIAL SURVEY)

Prepare a General Demolition Plan and submit proposed material handling procedures for approval before work is started. Perform and include in the plan an asbestos-containing material survey before any demolition activities occur to confirm that asbestos-containing material is not present. This survey is only applicable to the house on Parcel L and the barn on Parcel H. The survey shall be conducted by an AHERA certified asbestos inspector in accordance with 40 CFR 763. The plan shall be approved by the RA Construction Manager prior to work beginning. All items demarcated for removal are indicated on the Contract Drawings.

Do not begin demolition until authorization is received from the RA Construction Manager. Remove rubbish and debris from the project site; do not allow accumulations on each parcel. The work includes demolishing site features, recycling identified items (scrap metal) and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from each property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the RA Construction Manager. Avoid allowing demolition debris to contact contaminated soil.

Demolition debris shall be demolished, segregated, and disposed of or recycled at an approved offsite facility. If demolition debris comes in contact with contaminated soil, wash off soils before offsite disposal. Identify the offsite disposal facility and hauling methodology. Concrete shall be handled as described in Paragraph 3.2.1 herein.

1.6 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.7 WATER FOR DUST SUPPRESSION DURING DEMOLITION ACTIVITIES

Perform dust suppression activities as described in Section 01 57 20 ENVIRONMENTAL PROTECTION.

PART 2 PRODUCTS

2.1 SEPTIC SYSTEM COMPONENTS

Septic system components are indicated on the Contract Drawings, Site Details.

2.2 CONCRETE FOR MANHOLE ABANDONMENT

Concrete shall be provided as indicated in Section 03 30 00 CAST-IN-PLACE CONCRETE. An alternate mix design may be proposed by the E&R Contractor,

as approved by the RA Construction Manager.

PART 3 EXECUTION

3.1 EXISTING SITE FEATURES TO BE PROTECTED

Prior to the start of any onsite construction activities, the E&R Contractor and the RA Construction Manager shall make a joint existing conditions survey. Immediately following the survey, the E&R Contractor will prepare a brief existing condition survey report, including a plan describing the features requiring protection, which are (or are not) specifically identified on the Contract Drawings as features requiring protection immediately adjacent to or within the work areas (i.e., roadways, houses, major utilities).

This survey shall also include documenting (i.e., photographs, video) the condition of these features requiring protection. At a minimum, photographs shall be taken of the existing condition of site features, including roads, driveways, sidewalks, houses, structures (i.e., garages, utility sheds) and associated mechanical systems, foundations, and any other miscellaneous surface fixtures.

This survey report shall be signed by the E&R Contractor and the RA Construction Manager upon mutual agreement as to its accuracy and completeness. The E&R Contractor must protect those site and environmental features included in the survey report and any indicated on the Contract Drawings to the extent practicable.

Post-construction photographs shall also be taken to demonstrate the protection of features and post-construction condition.

If protected features are damaged, then repair the damage if possible at no additional expense to the RA Construction Manager. If the RA Construction Manager determines that the damage cannot be repaired to original (functioning) condition, then the damaged feature shall be replaced-in-kind at no additional expense.

Permanent site features that are not moveable shall be protected in-place, which include, but are not limited to, building foundations and siding, and major utilities (i.e., water mains, hydrants, overhead powerlines, fiberoptic cables). Take necessary precautions to avoid damage to existing items to remain in place or to remain at each parcel, as indicated on the Contract Drawings. Any permanent item damaged during construction activities shall be repaired or replaced-in-kind at the Contractor's expense.

Permanent structures, such as detached garages and sheds on concrete foundations, shall be protected-in-place for the duration of excavation and restoration activities. If loose soil is present within a secondary structure with a slab foundation, remove all items in contact with any soil, wash the items, and temporarily place items in an approved alternate location. The floor of the foundation shall be washed using a high velocity, low volume water sprayer and kept clean for the duration of the excavation and restoration activities. Displaced items will be returned to their original location.

3.2 EXISTING SITE FEATURES AND FACILITIES TO BE REMOVED

Existing site features and facilities identified for removal are indicated

on the Contract Drawings.

3.2.1 Concrete

The former concrete foundations, driveways, walkways, existing manholes, clarifiers at the Parcel WWTP, concrete septic tanks, and other miscellaneous concrete debris indicated for removal on the Contract Drawings shall be decontaminated of visible soil and broken down into manageable size chunks of concrete using mechanical equipment and transported to the designated temporary concrete processing area in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS. Provide straight and neat sawcuts on concrete that is to be removed and that is at limits of concrete where adjacent to house foundations, roadways, or other features to be protected.

Concrete removed shall be crushed and used as rubblized concrete for a marker barrier for contamination left-in-place in accordance with Section 31 23 00 EARTHWORK AND FILL. All reinforced steel bars shall be removed from the concrete, and recycled. If reinforced steel bars come in contact with contaminated soil, wash off soils before offsite recycling. The remaining concrete shall be crushed such that pieces of concrete are no larger than 6 inches in diameter. No visible dust shall occur during the crushing operation. All crushed and processed concrete shall be stockpiled at a location shown on the Contract Drawings until the material is needed for the marker barrier. Excess crushed concrete shall be placed into the onsite repositories upon completion of the project.

3.2.2 Scrap Metal

Recycle scrap metal generated during demolition activities, including metal fences, copper piping, etc. If scrap metal comes in contact with contaminated soil, wash off soils before offsite disposal. Provide separate containers to collect scrap metal, transport, and recycle at an approved offsite facility in accordance with the Environmental Protection Plan (see Section 01 57 20 ENVIRONMENTAL PROTECTION. Provide RA Construction Manager credit for recycled material.

3.2.3 Wood, Drywall, Roofing, Siding

General demolition debris that does not contain asbestos-containing material (ACM) generated during demolition activities (including decks, wood fences, wood joists, roofing material, etc.,) shall be transported, and disposed of at an approved offsite disposal facility. Ensure that general demolition debris does not contact contaminated soil. Demolition debris in contact with contaminated soil shall be thoroughly decontaminated such that no visible contaminated soil remains on the debris prior to disposal offsite.

3.2.4 Underground Sprinkler Systems

Sprinkler systems at unoccupied parcels shall be removed with no replacement and disposed of in the onsite repositories or washed in the exclusion zone and disposed of at an approved offsite disposal facility. The connection to the main water source shall be capped and flagged following restoration activities to mark where this connection exists for future reinstallation of the system by the homeowner.

Active sprinkler systems at occupied parcels shall be removed and replaced-in-kind with a new sprinkler system to original functioning

service. Owners will need to demonstrate to the RA Construction Manager that the sprinkler system is in work order prior to site work. Work shall be completed in accordance with Klamath County building code.

3.2.5 Asbestos-Wrapped Steam Pipe

Removal of asbestos-wrapped steam pipe shall only occur if steam pipe is encountered during the excavation of contaminated soil. Undisturbed steam pipe, specifically along the north side of Thicket Court, shall be left-in-place.

The Contract Drawings indicate the approximate location of asbestos steam pipe. If steam pipe is encountered and disturbed during excavation, the pipe (and associated pipe wrap) shall be removed. The pipe and pipe wrap shall be sealed with plastic sheeting and immediately transported and disposed of in the onsite repositories. During placement at the onsite repositories, the pipe and pipe wrap shall be covered with contaminated soils immediately to ensure that wind blow asbestos fibers from the steam pipe are not released to the air. Generous quantities of water for dust suppression shall be used while handling asbestos-wrapped steam pipe.

3.3 EXISTING SITE FEATURES TO BE RELOCATED AND RETURNED

Return and re-install existing site features that were relocated to a functioning service (or equal to existing functioning/non-functioning service) in accordance with Oregon Building Codes (OESC, OPSC, and ORSC) and Oregon Fire Code (OFC).

3.3.1 Moveable Structures

Skid-mounted or moveable secondary structures (i.e., sheds) shall be temporarily removed, washed, and returned to their original location or as directed by the RA Construction Manager. If the structure is determined to not be structurally sounded by the RA Construction Manager, it shall be demolished and disposed of at an approved offsite disposal facility. If the demolition debris comes in contact with contaminated soil, wash off soils before offsite disposal.

3.3.2 Covered Decks, Porches, and Patios

Relocate deck boards, including joists, from covered decks and covered porches, as indicated on the Contract Drawings. Install a geomembrane liner on the contaminated surface soils below the covered deck or porch in accordance with Section 02 05 20 WASTE CONTAINMENT GEOMEMBRANE and as indicated on the Contract Drawings unless otherwise directed by the RA Construction Manager. Deck boards that were relocated shall be washed and returned and reinstalled to their original location and condition. Deck boards and joists shall be reconnected using deck screws.

3.3.3 Propane; Oil Tanks; Heating, Ventilation, and Air Conditioning (HVAC) Units

Relocate propane, oil tanks, and HVAC units as indicated on the Contract Drawings. Wash and return the tanks to their original location or as directed by the RA Construction Manager. Consult with the Klamath County fire department prior to relocation activities. If these units are seated on a concrete pad, replace the concrete pad in accordance with Section 03 30 00 CAST-IN-PLACE CONCRETE.

3.3.4 Hot Tubs

Relocate hot tubs as indicated on the Contract Drawings. Wash and return the hot tubs to their original location or as directed by the RA Construction Manager. Hot tubs shall be re-installed to a functioning service (or equal to existing functioning/non-functioning service) by the Contractor.

3.3.5 County Road Signage and Guard Rails

Coordinate relocation of county signage and other roadway infrastructure with the Klamath County Road Department. Signage, such as street name and stop signs, located within the extent of excavation shall be removed and washed by the E&R Contractor and relocated by Klamath County and stored at an offsite location unless otherwise directed by the RA Construction Manager. Temporary signage shall be installed by the E&R Contractor during the construction period, in accordance with the Traffic Control Plan (See Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS). Work with Klamath County Road Division during restoration activities to return traffic signs.

3.3.6 U.S. Postal Service Mailbox

Coordinate with U.S. Postal Service a temporary postal box location during remedial action activities. Currently, a central mailbox is located at 3636 North Ridge Drive.

3.4 EXISTING SITE FEATURES TO BE REMOVED AND REPLACED

3.4.1 Miscellaneous Subsurface Features

Maintain utility services to each home in accordance with the property access agreement. If utilities need to be disconnected temporarily, contact the applicable utility entity to coordinate the disconnection of the service. Provide temporary utilities in the event of a loss of service. If damages to underground utilities during excavation activities occur, contact the utility entity and the RA Construction Manager immediately. Complete all utility repairs at no additional cost to the RA Construction Manager.

Subsurface piping that interferes with soil excavation activities, such as water, cable, and electrical service lines, shall be disconnected, cut, and replaced, and the service shall be returned to a functioning service, including the performance of flushing/pressure tests when required. Coordinate these actions with the respective utility entity prior to work. Any debris generated during these activities shall be decontaminated and disposed of at an approved offsite facility, if segregation from contaminated soils is practicable.

3.4.2 Septic Systems

Excavation of septic system (tanks, pipes, drainfield) shall occur as indicated on the Contract Drawings during the excavation of contaminated soil. The approximate location of septic systems is shown on the Contract Drawings. Septic system components shall be excavated and disposed of in the onsite repositories. Concrete septic tanks shall be pumped out, washed, crushed, and reused as described in Paragraph Concrete above.

If home(s) remain occupied during removal and replacement of septic

system, additional measures, such as temporarily pumping existing septic tanks to maintain service during removal/replacement, may be required. Coordinate the proposed septic system demolition schedule with the RA Construction Manager to ensure that sanitary services are maintained if homeowners remain present during work activities. Coordinate sanitary waste disposal services to pump out septic tanks as necessary to maintain service during the work.

Prevent equipment from tracking across the septic drainage areas as shown on the Contract Drawings to preserve infiltration capacity. The septic drainage area (and alternative approved area) shall be delineated with orange safety fencing.

Submit septic system installation plans for each parcel where either all or a portion of the existing septic system shall be replaced. Since electrical power at the treatment unit will be required with Treatment Standard 1 technology, power drop and unit hook-up methods shall be included in the replacement plans. Each installation plan shall include shop drawings of the septic system to be installed. The septic system shall be an Oregon Department of Environmental Quality (ODEQ) approved system (see http://www.deq.state.or.us/wq/onsite/apptanks.htm) and in general conformance with the Contract Drawings and Oregon Treatment Standard 1. Installation of septic system shall be in accordance with the selected system manufacturer's recommendations. An advanced treatment technology system, as shown on the Contract Drawings, shall be installed. Sand backfill shall be in accordance with Section 31 23 00 EARTHWORK AND FILL. The approved septic system installation plan shall preclude the need for a formal site evaluation process.

In accordance with the property access agreements, the E&R Contractor shall coordinate with the RA Construction Manager and the property owner to complete the application for a new septic system permit. The E&R Contractor shall be responsible for ensuring that the application is complete and must submit the application on behalf of the property owner. A Site Evaluation Report is not necessary since these replacement systems have been pre-approved by ODEQ and Klamath County.

New replacement septic systems shall be installed by a State of Oregon licensed contractor. Coordinate and complete technical inspections of systems with Klamath County. The Contractor shall be responsible for coordination of payment of fees to Klamath County for septic system replacement.

Provide property owner and RA Construction Manager with a Certificate of Satisfactory Completion and 2-year manufacturer's warranty documentation following completion of satisfactory inspection(s).

3.4.3 Deck Structure and Components

Replacement components of each deck must meet current Klamath County building code standards and be inspected and approved by the County Building and Planning Department following construction. Install temporary steps if replacement of deck does not occur immediately following demolition of existing structure.

3.5 EXISTING SITE FEATURES TO BE DEMOLISHED OR ABANDONED

Abandon existing stormwater and sewer pipelines at existing manhole locations by sealing the pipe from the invert to the top of pipe inside

each manhole and filling with concrete (or approved equal material) in accordance with Section 03 30 00 CAST-IN-PLACE CONCRETE and as shown on the Contract Drawings. Demolish the portion of manhole that is exposed during excavation activities. Demolished concrete shall be handled as described in Paragraph 3.2.1 herein. Backfill existing manholes and install the frost protective cap. The existing storm and sanitary sewer pipelines that connect each manhole will be left-in-place and will not be plugged with the concrete mixture.

-- End of Section --

SECTION 02 61 13

EXCAVATION AND HANDLING OF CONTAMINATED SOIL

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the excavation, loading, hauling, placement, and compaction of contaminated soil in the onsite repositories as shown on the Contract Drawings. In addition, this work includes the post-excavation washing of hard surface features such as driveways. This work includes furnishing all labor, materials, equipment, and incidentals required for the excavation, handling, and disposal of contaminated soils.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
49 CFR 100	Hazardous Materials Transport
49 CFR 177	Carriage by Public Highway

OREGON ADMINISTRATIVE RULES (O.A.R)

OAR 340-093	Solid Waste: General Provision
OAR 340-095	Solid Waste: Land Disposal Sites Other Than Municipal Solid Waste Landfills

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Excavation Work Plan; G

Submit no later than 30 days after receipt of Notice to Proceed.

SD-05 Design Data

Compaction Inspection Forms

SD-07 Certificates

Professional Structural Engineer Certificate; G

Any foundation assessments needed shall be completed by a professional structural engineer licensed in the State of Oregon.

1.4 EXCAVATION WORK PLAN

Submit an Excavation Work Plan within 30 calendar days after Notice to Proceed. No work at the site, with the exception of site inspections and surveys, shall be performed until the Work Plan is approved. At a minimum, the Work Plan shall include:

a. Schedule of activities, in conformance with Section 01 32 01 PROJECT SCHEDULE

b. Method(s) of excavation and equipment to be used in Legacy Tree Protection Area (LTPA) and in other tree areas.

c. Method of excavation and equipment to be used

d. Seasonal sequencing and parcel sequencing method of construction. Parcel sequencing method of construction for Parcels AM, AQ, BM, BO, BR, BS, F, H, MBK-G, N, P, and WWTP shall be performed to provide continued access to residents during construction, or to limit amount of time residents are temporarily relocated. This may include temporary access road construction or phasing work at parcels.

e. Method of protection of existing structures, septic system drainfield subgrade, and utilities

f. Process for foundation assessment if excavation activities exceed 2 feet bgs adjacent to existing residential structures and excavation methods that will be employed to protect foundations

g. Shoring or side-wall slopes proposed, as necessary

h. Transportation and hauling methodology

i. Acknowledgement of requirements of property access agreements

This plan shall also serve as a coordination tool for the E&R Contractor, RA Construction Manager, and the residents who require temporary relocation.

1.5 GROUNDWATER

Depth to groundwater is much greater than 4 feet below pre-excavation ground surface and is not expected to be encountered during excavation activities.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 CONTAMINATED SOIL EXCAVATION

3.1.1 Safety and Health

Excavation of contaminated materials shall be conducted in accordance with the safety and health standards and regulations specified in Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE and in accordance with the site-specific Safety and Health Plan (SSHP).

3.1.2 Excavation of Contaminated Soil

Areas of contamination shall be excavated to a minimum depth of 2 feet below ground surface (bgs) and/or to the lateral extent and depth shown on the Contract Drawings.

If visible asbestos-containing material (ACM) exists at the base of the initial excavation of 2 feet bgs, additional excavation shall be conducted in 6-inch increments until a maximum of 4 feet bgs is reached, as directed by the RA Construction Manager and based on the visual inspection criteria described in Paragraph 3.7 below. The Contract Drawings show where "BURIED ACM" may exist below 2 feet bgs based on information obtained from the previous investigations. Survey visible contaminated left in place in accordance with Section 01 71 23 CONSTRUCTION SURVEYING and Section 01 78 00 CLOSEOUT SUBMITTALS.

Excavation of contaminated areas shall be sequenced such that all work begins at the furthest point from the exclusion zone (EZ) ingress and egress. Work shall continue towards the ingress and egress, exposing the excavation floor as work proceeds. This method eliminates the potential for smearing contamination or importing contamination into areas already cleared for visible ACM. The smearing of ACM may cause an unnecessary increase in the volume of contaminated soils destined for the onsite repositories and may limit capacity in the repositories. Excavation work shall be performed in a manner that will limit spills and mitigate cross-contamination. If a spill occurs, cleanup soil in accordance with the Environmental Protection Plan as described in Section 01 57 20 ENVIRONMENTAL PROTECTION.

3.1.3 Excavations Adjacent to Structure Foundations

Prior to excavation work adjacent to structure foundations, the E&R Contractor and the RA Construction Manager shall identify any apparent or obvious structural concerns. Any structure that appears to have existing structural issues (i.e., cracks along foundation walls, slumping foundations, etc.) or excavation greater than 2 feet bgs adjacent to the structure foundations shall require a structural engineer to provide an onsite assessment of the foundation or structure prior to any excavation work. The E&R Contractor and RA Construction Manager shall carefully document existing conditions (i.e., photographs) of each foundation prior to excavation activities.

The structural engineer shall evaluate the condition of the structure or foundation, review the scope of the excavation work adjacent to the foundation, and provide recommendations to mitigate further damage to the building and to ensure worker safety during the excavation activities. Recommendations may include, but are not limited to, building bracing, foundation shoring, and/or incremental excavation techniques. The

excavation work plan shall incorporate recommended activities.

If visible ACM cannot be safely excavated adjacent to the structure, then a marker barrier shall be placed over the contaminated soil remaining. The contamination left-in-place shall be surveyed and recorded on the as-built drawings.

3.1.4 Excavations Adjacent to Roadways

As shown on the Contract Drawings, excavation of road shoulders shall be required. Excavate along the edge of pavement, so as not to undermine the roadway. Document existing conditions (i.e., photographs) of each roadway prior to excavation activities. Subsoil or other temporary bracing may be placed against the edge of pavement shortly after excavation to further prevent undermining/sloughing.

During excavation work adjacent to roadways, manage traffic as indicated in the Traffic Control Plan in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

3.1.5 Excavations within Tree Root Areas

3.1.5.1 Legacy Tree Protection Area (LTPA)

The RA Construction Manager shall confirm with stakes, or other marker devices, each LTPA, as approximately identified on the Contract Drawings. Protect all legacy trees within the LTPA. The LTPA may extend beyond the dripline of the trees, as directed by the RA Construction Manager.

Within each LTPA, the E&R Contractor shall excavate the uppermost 6 inches of soil (or deeper if no roots are present) while minimizing damage to tree roots during excavation. Heavy equipment shall not be permitted within the LTPA. Exposed roots shall be covered daily with wetted burlap and kept moist until excavation is cleared and backfilled. Roots encountered at the boundary of the LTPA shall be, to extent practical, protected or cut with a clean vertical slice instead of tearing or slashing the root system if protection is not feasible, as directed by the RA Construction Manager. Excavation of areas outside of the LTPA shall be carefully excavated using standard equipment and excavation means and methods for excavating contaminated soil.

Following excavation, the E&R Contractor and the RA Construction Manager will jointly conduct a visual inspection of the excavation floor and/or root system. If ACM is not present within the LTPA, then the excavation is considered complete. If ACM is present, the decision to continue excavating or to remove the tree will be determined by the RA Construction Manager.

Immediately following clearance of the excavation area by visual inspection within the LTPA, the E&R Contractor shall remove the wetted burlap temporary cover and backfill with growth media in accordance with Section 31 23 00 EARTHWORK AND FILL. The E&R Contractor shall be responsible for providing supplemental water, when rainfall is less than 1 inch per week, until the cap has been fully installed across the affected parcel or a period of one month, whichever is greater.

The E&R Contractor and RA Construction Manager shall re-evaluate the health of the trees within each LTPA one-year following completion of the parcel restoration work or if trees are showing obvious signs of distress

within a short-term time frame (i.e., 3 months). As determined by the RA Construction Manager, if a tree(s) appears to be distressed or in poor health, the RA Construction Manager shall direct the E&R Contractor to fell the legacy tree in accordance with Section 31 11 00 CLEARING AND GRUBBING and contaminated soils shall be excavated in accordance with Paragraph EXCAVATION OF CONTAMINATED SOIL above.

3.1.5.2 Other Tree Areas

For all other areas outside of the LTPA as shown on the Contract Drawings, trees and other vegetation shall be cleared and grubbed in accordance with Section 31 11 00 CLEARING AND GRUBBING. Contaminated soils shall be excavated as described in Paragraph EXCAVATION OF CONTAMINATED SOIL above.

3.2 EXCAVATIONS AROUND SUBSURFACE FEATURES

Subsurface features include but are not limited to, septic systems, waterlines, sewer lines, powerlines, cable lines, and sprinkler systems. In addition, former Marine Recuperation Barracks (MRB) utilities, such as water, storm and sewer lines, and asbestos-wrapped steam pipe, may also be present and encountered. Excavation activities will also occur within the right-of-way along county roadways; therefore, main utility lines may be encountered as well. Management of subsurface features during excavation shall be conducted in accordance with Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

3.3 CONTAMINATED SOIL TEMPORARY STOCKPILES

Contaminated soil stockpiles shall not be permitted. Contaminated soil shall be live-loaded directly into trucks and waste transported to the on-site repositories.

3.4 VISUAL INSPECTION OF ACM REMOVAL

The E&R Contractor and RA Construction Manager shall jointly conduct a visual inspection of the excavation floor and sidewalls following initial excavation of contaminated soil to the lateral extent and depth as shown on the Contract Drawings as follows:

a. If visible ACM is present at the base of the excavation or within the excavation sidewalls, place flags or other markers on each visible piece of ACM.

b. ACM visible in the base or sidewalls of excavation shall be excavated at minimum excavation depth increments of 6 inches. Upon completion of each incremental excavation, repeat the visible inspection process. If visible ACM remains, excavation shall continue to a maximum of 4 feet bgs.

c. If visible ACM is located outside the initial excavation boundary, a perimeter shall be marked around these additional area(s) and a 2-foot excavation will be performed, as directed by the RA Construction Manager. A subsequent visual inspection will be conducted within this expanded excavated area to confirm that no visible ACM is present.

d. If no visible ACM is present, spray water on the excavation area to simulate rain and expose any ACM that may still be present on the surface. Following the watering process, the E&R Contractor and RA Construction Manager will conduct an additional joint inspection of

the bottom of excavation as well as the sidewalls. Reconfirm that no visible ACM is present following the second inspection. If visible ACM is present, repeat the inspection and excavation process as described above.

e. If the second inspection indicates no visible ACM or if the excavation depth has reached 4 feet bgs, then the excavation is complete and restoration activities may proceed. Revise as-built drawings to document excavation extent and ACM left-in-place in accordance with Section 01 71 23 CONSTRUCTION SURVEYING and Section 01 78 00 CLOSEOUT SUBMITTALS.

3.5 POST-EXCAVATION WASHING OF HARD SURFACES

Following completion of contaminated soil excavation and after visual inspection for ACM, wash all hard surfaces using available water sources (i.e., fire hoses used for dust suppression, water trucks) to remove any dust or other debris left on hard surfaces such as structures, driveways left-in-place, or roadways. Post excavation washing shall be completed prior to restoration activities to mitigate cross-contamination concerns and shall be conducted such that water drains back into excavated areas.

3.6 TRUCK LOADING, TRANSPORTATION, AND DISPOSAL OF CONTAMINATED SOIL

Contaminated soils shall be excavated and live-loaded into trucks or trailers directly within each exclusion zone. The utmost care shall be given during loading to ensure that the truck or trailer exterior remains clean. Regardless, trucks or trailers shall be decontaminated prior to leaving each exclusion zone as described in Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE. Contaminated soils shall be disposed of in the on-site repositories.

Trucks cabs shall be equipped with positive air pressure high-efficiency particulate absorption (HEPA) filter systems. Ensure that operators are fully trained in usage of the air filtrate in accordance with SSHP (See Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE).

Before departing each exclusion zone, trucks and trailers shall have tarps secured over the beds, and truck and trailer beds shall be sealed watertight. Any damaged or inadequately covered or sealed beds observed by the E&R Contractor or RA Construction Manager shall be immediately removed from service until the necessary repairs or corrections are made.

Offroad haul trucks may be used but must comply with county road regulations if driven on or across public roadways. Written permission to use offroad haul trucks on or across public roadways must first be obtained from the RA Construction Manager, then by Klamath County.

Transportation of contaminated material shall adhere to regulations 40 CFR 261 to 40 CFR 265 along with 49 CFR 100 to 49 CFR 177 and Oregon regulations OAR 340-093 to OAR 340-095.

3.7 ON-SITE CONTAMINATED MATERIAL REPOSITORIES

Temporary signage shall be installed in accordance with Section 01 58 13 TEMPORARY SIGNAGE during consolidation activities and while repositories remain active including between construction seasons. These signs shall be removed once the frost protective cap is installed on the repository and the repository is considered complete at the completion of the remedial

action (RA) activities.

The onsite repositories are considered to be exclusion zones while consolidation activities occurs. Work zones shall be installed around the perimeter of the repositories in accordance with Section 01 35 29 SAFETY, HEALTH, AND EMERGENCY RESPONSE.

3.7.1 Repository Area Subgrade Preparation

Prior to contaminated soils and material consolidation, existing sloped surfaces that are steeper than 3 Horizontal:1 Vertical (3H:1V) shall be plowed, stepped, serrated, benched, or broken up so that the contaminated material will bond with the existing surface, as indicated on the Contract Drawings. For sloped areas less than 3H:1V, the surface shall be prepared by scarifying or other approved methods. No excavation of bedrock shall be required.

3.7.2 Compaction Requirements

Contaminated soils and material placed in the onsite repositories shall be compacted to a firm and unyielding surface with a minimum of five passes of a 10-ton non-vibratory roller before the overlaying lift is placed. If smaller equipment, such as a plate packer and/or mechanical tamper, is required for areas with tight access, the compacted surface will produce a firm and unyielding surface. Soils shall be placed in lifts no greater than 12 inches. Given this performance-based approach for compaction, quality control testing will not be required. However, visual inspection that the compaction has produced a firm and unyielding surface and that the minimum compaction effort was completed (i.e., five passes of a 10-ton non-vibratory roller) will be documented in daily compaction inspection forms.

Operations shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing, or other unsatisfactory conditions of the field. When so directed, drag, blade, or slope the embankment to provide proper surface drainage.

3.7.3 Finished Grade Preparation

Verify that finished grades are as shown on the Contract Drawings or as approved by the RA Construction Manager. The finished grade of the contaminated material in the onsite repositories shall be scarified prior to placement of the frost protective cap. Scarification shall be accomplished by scarifying, disking, harrowing or other approved methods to a depth of 12 inches.

The frost protective cap shall be installed in accordance with Section 31 23 00 EARTHWORK AND FILL, Section 32 92 19 GROWTH MEDIA AND SEED, and as indicated on the Contract Drawings.

3.8 OVERNIGHT/WEEKEND DUST CONTROL AND SECURITY

At the completion of consolidation activities each day or at the end of the work week, maintain a wetted surface to ensure that no visible emissions are seen and asbestos fibers do not become airborne while the repository is inactive. Dust controls shall be conducted in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION. Access to the repositories shall be prevented during inactive periods.

-- End of Section --

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall consist of furnishing, placing, and finishing commercial grade concrete (CGC) for the installation concrete of walkways as shown on the Contract Drawings and in accordance with 2008 Oregon Department of Transportation (ODOT)/American Public Works Association (APWA) Standard Specification ODOT 00440.00, as modified herein.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

OREGON DEPARTMENT OF TRANSPORTATION (ODOT)

ODOT 00440.00	Standard Specification for Commercial Grade Concrete

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-05 Design Data

Concrete Mix Design; G

Thirty days minimum prior to concrete placement, submit a mix design for each strength and type of concrete. Submit a complete list of materials, including air entraining mixtures, cement, each size of aggregate, fly ash, other admixtures, and waster.

SD-06 Test Reports

Concrete Mix Ticket

Slump Tests

Temperature Tests

Air Content

1.4 QUALITY CONTROL

1.4.1 Concrete Mix Ticket

Submit copies of laboratory test reports showing that the mix has been successfully tested to produce concrete with the properties specified and that mix must be suitable for the job conditions, such as compressive

strength tests (include break test results). Provide list of contents, weights, volumes, and temperature. Submit concrete ticket report along with the concrete mix design. Obtain approval from the Contracting Officer's Representative before concrete placement.

1.4.2 Slump Tests

Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved admixture provided that the water-cement ratio is not exceeded. Perform tests at commencement of concrete placement and for each batch (minimum) or every 20 cubic yards (maximum) of concrete.

1.4.3 Temperature Tests

Test the temperature of the concrete delivered and the concrete in the forms. Perform tests in hot or cold weather conditions (below 50 degrees F and above 80 degrees F) for each batch (minimum) or every 20 cubic yards (maximum) of concrete until the specified temperature is obtained and whenever test cylinders and slump tests are made.

1.4.4 Air Content

Test air-entrained concrete for air content at the same frequency as specified for slump tests.

PART 2 PRODUCTS

2.1 ODOT COMMERCIAL GRADE CONCRETE

Furnish a workable CGC mixture per ODOT 00440.00 that is uniform in composition and consistency, and has the following characteristics.

Compressive Strength -	Minimum 3,000 pounds per square inch (psi) at 28 days
Slump -	5 inches or less
Temperature -	Minimum 50 degrees F to maximum 90 degrees F
Entrained Air -	4.0 to 7.0 percent

PART 3 EXECUTION

3.1 GENERAL

Install concrete as shown on the Contract Drawings and in accordance with ODOT 00440.00. Provide contraction joints spaced every 5 linear feet unless otherwise indicated. Cut contraction joints 1-inch deep with a jointing tool after the surface has been finished. Give walkways a broomed finish. Expansion joints shall be installed every 50 linear feet or where the concrete walkway connects with the house foundation or along other above ground structures.

3.2 PLACEMENT OF CONCRETE

Place concrete according to the following practices:

a. Place using best common practices to avoid segregation.

b. Vibrate and spade to achieve a dense homogeneous concrete, free of voids and rock pockets.

c. Place within 90 minutes after batching and mixing.

3.3 WEATHER

Do not place concrete when the air temperature is below 35 degrees. Fahrenheit without approval. Protect concrete from freezing if the air temperature is expected to drop below 35 degrees. Fahrenheit during the first 5 calendar days after placement.

-- End of Section --

SECTION 03 40 00

PRECAST CONCRETE

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall consist of furnishing and installing precast concrete for the proposed stormwater manhole and reinforced concrete pipe as shown on the Contract Drawings and in accordance with 2008 Oregon Department of Transportation (ODOT)/American Public Works Association (APWA) Standard Specification ODOT 00440.00 and ODOT 00470.00, as modified herein.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

OREGON DEPARTMENT OF TRANSPORTATION (ODOT)

ODOT 00440.00	Standard Specification for Commercial Grade Concrete
ODOT 00470.00	Manholes, Catch Basins, and Inlets

ASTM INTERNATIONAL (ASTM)

ASTM C 478	(2013) Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 497	(2013) Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile
ASTM C 1433	(2013b) Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-05 Design Data

Concrete Manhole and Box Culverts; G

Prior to fabrication of the precast box manhole and culverts, submit drawings and design calculations stamped, by a professional structural engineer registered in the State of Oregon, to the RA Construction Manager's for review. Manholes and culverts must be designed to withstand the load of the design fill height, plus any equipment surcharge. All precast sections furnished under this contract shall be fabricated in full accordance with the approved shop drawings.

Precast Concrete Mix Design; G

Thirty days minimum prior to concrete placement, submit a mix design for each strength and type of concrete. Submit a complete list of materials including air entraining mixtures, cement, each size of aggregate, fly ash, and other admixtures.

SD-06 Test Reports

Concrete Mix Ticket

1.4 QUALITY CONTROL

1.4.1 Concrete Mix Ticket

Submit copies of laboratory test reports showing that the mix has been successfully tested to produce concrete with the properties specified and that mix must be suitable for the job conditions, such as compressive strength tests (include break test results). Provide list of contents, weights, volumes, and temperature of concrete mix. Submit concrete ticket report along with the concrete mix design. Obtain approval from the RA Construction Manager before concrete placement.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE

The following describes the materials needs for the installation of the concrete box culvert:

a. Furnish a precast commercial grade concrete (CGC) mixture per ODOT 00440.00 that is uniform in composition and consistency as described in Section 03 30 00 CAST-IN-PLACE CONCRETE.

b. The precast reinforced manhole and culvert sections shall be made up of sections of monolithically cast concrete. The manhole and culvert sections shall have internal dimensions as shown on the Drawings and shall have a male and female end. The precast concrete sections shall, as a minimum, conform to ASTM C 478 and ASTM C 1433, as applicable, and shall be designed to support loading.

c. The 28-day compressive strength of the concrete, as indicated by cores cut from the culvert shall not be less than 5,000 pounds per square inch (psi). The concrete mass shall be dense and uniform. Minimum reinforcement in the precast manhole and culvert shall be as required by ASTM C 478 and ASTM C 1433, respectively.

d. The quality of all materials and the finished shall be subject to inspection and approval by the RA Construction Manager. Precast concrete rejected after delivery shall be marked for identification and shall be removed from the job at once.

e. The RA Construction Manager shall have the right to cut cores from such pieces of the finished precast concrete and test when deemed necessary. Cores shall be obtained, capped, and sealed in conformity with ASTM C 478 and ASTM C 1433, as applicable. Core drilling and filling shall be carried out by the manufacturer at their expense.

f. The RA Construction Manager shall inspect all precast sections for quality and compliance with ASTM C 478 and ASTM C 1433, as applicable, and with the approved manufacturer's drawings. The manufacturer shall inspect all joints for uniformity and ends for squareness. The manufacturer shall furnish to the Contractor a notarized affidavit stating all precast units meet the requirements of ASTM C 478 and ASTM C 1433, as applicable, this section, and the joint design with respect to square ends and uniform joint surfaces.

g. Pits, blisters, rough spots, breakage and other imperfections may be repaired, subject to the approval of the RA Construction Manager, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Non-shrink cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at the end of 7 days and 6,000 psi at the end of 28 days when tested in 3-inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the RA Construction Manager.

Prior to delivery, a yard permeability test shall be required at the point of manufacture. The precast sections to be tested shall be selected at random from the stockpiled material to be supplied to the Project. All test specimens shall meet the permeability test requirements of ASTM C 497.

PART 3 EXECUTION

3.1 PRECAST CONCRETE MANHOLE INSTALLATION

Install precast concrete manhole to the lines and grades as shown on the Contract Drawings and in accordance with ODOT 00470.00.

3.1.1 Precast Manhole Base

Place the base section on the prepared bedding so as to be fully and uniformly supported at true grade and alignment.

3.1.2 Precast Manhole Sections

Thoroughly wet all lift holes, completely fill with nonshrink grout, and smooth and point both inside and out to ensure water tightness.

3.1.3 Grouting

Install non-shrink grout on joints and on extension rings and complete the following:

a. Clean and wet the surfaces to be joined with water.

b. Apply non-shrink grout to the lower portion of the bell or groove of the section already laid and to the upper portion of the spigot or tongue of the section being laid.

c. Clean the joint recesses, fill completely with non-shrink grout and wipe to a smooth finish both inside and out.

d. Do not allow free water to come in contact with grout joints within 24 hours after the mortared joints are finished.

e. Protect the completed joints against rapid drying.

Set metal frames for manholes on full non-shrink grout beds to prevent infiltration of surface water or groundwater between the frame and the concrete of the manhole section. If concrete is to be poured around the frames, coat the portion of the frame that will contact the concrete with hot asphalt before placing the concrete. Set frames, covers, and grates true to the locations and grades established. Clean bearing surfaces and provide uniform contact. Secure all fastenings. Construct all mortared, sanitary sewer manhole necks and all riser ring joints made with non-shrink grout using an approved commercial concrete bonding agent applied to all cured concrete surfaces being grouted.

3.1.4 Cleanup

Upon completion, clean each structure of accumulated silt, debris or foreign matter of any kind and keep clean until final acceptance of the work.

3.2 PLACEMENT OF BOX CULVERT

Bedding material shall consist of a minimum of 6 inches of gravel in accordance with Section 31 23 00 EARTHWORK AND FILL. Bedding shall be placed on cut native ground or on ground that has been well compacted by rollers, crawler tractors or mechanical tampers subject to the approval of the RA Construction Manager. Compaction shall continue until the surface is well compact, even, and true to the proposed lines and grades.

When joining box sections together, a "come-along", box puller, or other similar method should be used. Construction equipment, such as backhoes, front-end loaders, etc., must NOT have direct contact with the precast concrete culvert sections. If such construction equipment is used, a timber or other cushioning medium must be utilized.

Joints for concrete culverts shall conform to ASTM C 1433 and laid together such that they will make a continuous line of box sections with a smooth interior free of appreciable irregularities in the flow line. The space between consecutive precast box sections shall be in accordance with the manufacturer's recommendations. Consecutive box sections shall be assembled together such that the joint material provides a soil tight system.

3.3 BACKFILLING

All backfill around the precast concrete units shall be placed in accordance with Section 31 23 00 EARTHWORK AND FILL and in accordance with requirements of the precast concrete manufacturer.

-- End of Section --

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall consist of clearing, grubbing, removing, and otherwise disposing of vegetation and debris within the work limits at Operable Unit 1 (OU1) as designated on the Contract Drawings. Vegetation and objects outside of the work limits shall be preserved free from injury and defacement. Clearing and grubbing activities shall be completed using appropriate dust controls in accordance with Section 01 57 20 ENVIRONMENTAL PROTECTION.

1.2 MIGRATORY BIRD AVOIDANCE STRATEGIES

In order to avoid impacts to migratory birds, the E&R Contractor shall develop site-specific migratory bird avoidance strategy as recommended by the United States Fish and Wildlife Service. Strategies may include the following efforts, which are listed in order of preference:

a. Avoid clearing and construction during the migratory bird nesting season (March 1 to August 31).

b. Vegetation removal and ground disturbing activities should be phased to occur outside of the nesting season (March 1 to August 31).

c. Any areas that are cleared and grubbed prior to the migratory bird season but that are not constructed within a reasonable timeframe would be maintained, as practicable and necessary, to avoid the regrowth of nesting habitat.

d. Survey for nesting birds within 5 days of construction in any areas that were not cleared prior to March 1. If nests are identified during surveys, work would stop until the appropriate construction buffer around the nest can be determined. Construction would restart after nest had failed or the chicks have fledged.

e. Other reasonable, prudent, and effective measures include use of suitable mufflers on engines to minimize noise and use of approved roadways for construction traffic.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 PROTECTION OF VEGETATION LEFT STANDING

Trees and vegetation to be left standing (i.e., outside of the work limits) shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

Trees identified within the Legacy Tree Protection Areas shall not be cleared or grubbed, but rather protected in place in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED SOIL.

3.2 CLEARING TREES AT ODOT BORROW AREA

Clearing operations at the ODOT government-furnished borrow source area shall be completed by others. Perform stump removal and disposed of at an approved offsite landfill.

3.3 CLEARING TREES AT OU1 AND PARCEL H BORROW SOURCE AREA

3.3.1 Large Trees

Clearing of large trees shall consist of the felling, trimming, delimbing, and cutting all trees greater than or equal to 12 inches in diameter. Avoid contact with contaminated soil during tree clearing operations. If trees come in contact with contaminated soil, they must be decontaminated and free of visible soil. Clearing shall include the grinding of stumps and roots with mechanical grinding equipment. Chipped material will be either reused on-site or disposed of at an approved offsite landfill.

Delineate temporary wood waste processing areas, as shown on the Contract Drawings or at a location as proposed by the E&R Contractor and approved by the RA Construction Manager.

3.3.2 Small Trees

Clearing of small trees shall consist of felling, trimming, and cutting all trees less than 12 inches in diameter within limits of contaminated soils. Avoid contact with contaminated soil during tree clearing operations. If trees come in contact with contaminated soil, they must be decontaminated and free of visible soil. Clearing shall include the complete removal of stumps and roots with mechanical equipment.

Chip all cleared trees less than 12 inches in diameter, limbs, tops, and stumps. Chipping activities shall be conducted at the temporary wood waste processing area in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS. Chipped material will be either reused on-site or disposed of at an approved offsite landfill.

Delineate temporary wood waste processing areas, as shown on the Contract Drawings or at a location as proposed by the E&R Contractor and approved by the RA Construction Manager.

3.4 GRINDING ROOTS AND STUMPS

Stumps and roots must be ground to a depth of no less than 24 inches below ground surface (bgs). During grinding operations, remove grinding debris to allow visual inspection of the asbestos-containing material (ACM) in soil in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED SOIL. Haul grinding debris to the onsite repositories.

3.5 CLEARED TIMBER USE

Cleared trees shall be temporarily stockpiled in clean area. Cleared trees shall be sent offsite for unrestricted use to an approved lumber processing facility as directed by the RA Construction Manager. Proceeds from any sale of cleared trees shall be credited to the RA Construction

Manager.

-- End of Section --

SECTION 31 23 00

EARTHWORK AND FILL

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include furnishing all labor, materials, equipment, and incidentals required to excavate, screen, test, stockpile, load, haul, and place borrow source restoration materials as shown on the Contract Drawings. In addition, work includes the procurement and placement of other import material such as gravel, filter media sand, and excess rubblized concrete.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 27	(2006) Sieve Analysis of Fine and Coarse Aggregates

ASTM INTERNATIONAL (ASTM)

ASTM C 33	(2013) Standard Specification for Concrete Aggregates
ASTM D 422	(2007) Particle-Size Analysis of Soils
ASTM D 698	(2012) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 1556	(2007) Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

OREGON DEPARTMENT OF TRANSPORTATION (ODOT)

ODOT 02630.10	2008 Standard Specification for Dense-Graded Aggregate

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Borrow Source Work Plan; G

Submit no later than 30 days after receipt of Notice to Proceed.

SD-05 Design Data

Repository Winterization Plan; G

SD-07 Certificates

Filter Media Sand Gradation
Gravel Gradation

1.4 BORROW SOURCE WORK PLAN

No work at the borrow source areas, with the exception of site inspections and surveys, shall be performed until the Work Plan is approved. Allow 30 calendar days in the schedule for the Government's review. At a minimum, the work plan shall include:

a. Schedule of activities, in conformance with Section 01 32 01 PROJECT SCHEDULE

b. Geotechnical sampling and analysis procedures, frequency of sampling, and reporting form

c. Method for excavation and screening, and equipment to be used

d. Borrow processing and stockpiling methods

e. Shoring or side-wall slopes proposed, if necessary

f. Haul road maintenance in accordance with Section 01 35 12 ROAD MAINTENANCE AND DUST CONTROL.

g. Access route(s) development

h. Transportation methodology

i. Placement of borrow source materials including slope stability measures

j. Restoration of borrow source (limited only to Parcel H)

PART 2 PRODUCTS

2.1 BORROW SOURCE RESTORATION MATERIALS

Materials described in this section are defined as restoration fill materials that shall be developed from near-site borrow source locations, as shown on the Contract Drawings. All material shall be excavated, screened, tested, and stockpiled outside the limits of contamination. Geotechnical sampling data from each borrow source area is provided in Attachment 1.

2.1.1 Subsoil

Subsoil is defined as overburden material that is screened to less than 6-inch diameter. Subsoil shall not be amended. Subsoil shall be utilized as backfill for deeper excavation areas and the initial 18-inch layer of the frost protective cap as indicated on the Contract Drawings.

2.1.2 Growth Media

Growth media is defined as overburden material from a borrow source location that is screened to less than 2-inch diameter with acceptable fine fraction of 20 percent and amended as described in Section 32 92 19 GROWTH MEDIA AND SEED. Growth media shall be free of foreign matter and objects larger than 2 inches in any dimension.

2.1.3 Oversize Material

Oversize material is defined as reject material that was generated during the screening process of growth media (greater than 2-inch diameter) and subsoil (greater than 6-inch diameter).

Oversize material shall be utilized as slope stability and channel erosion protection material. Excess oversize material may be utilized as backfill for deeper excavation areas.

2.1.4 Boulders

Boulders are defined as rocks greater than 18 inches in diameter. Boulders shall be utilized for access prevention at onsite repositories as indicated on the Contract Drawings. Excess boulders may be used for access prevention at the borrow source areas.

2.2 IMPORTED RESTORATION MATERIALS

2.2.1 Filter Media Sand

Filter media sand and shall be used for septic drainfield construction as indicated on the Contract Drawings. Perform sieve analysis according to ASTM C 33. Chemical testing shall be conducted as described in Section 01 45 10 IMPORT MATERIAL SAMPLING.

Filter Media Sand Gradation

U.S. STANDARD SIEVE	**Mass Percent Passing Square Mesh Sieves**
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30

U.S. STANDARD SIEVE	Mass Percent Passing Square Mesh Sieves
No. 100	2-10
No. 200	0

2.2.2 Gravel

Gravel is defined as 3/4" minus crushed stone in accordance with 2008 Oregon Department of Transportation (ODOT)/American Public Works Association (APWA) Standard Specification ODOT 02630.10. Gravel shall be used for the construction of road shoulders, a base layer for concrete walkways, asphalt driveways, and culverts as indicated on the Contract Drawings. Sieve analysis shall be determined according to AASHTO T 27. Chemical testing shall be conducted as described in Section 01 45 10 CHEMICAL DATA QUALITY CONTROL.

Gravel Gradation

U.S. STANDARD SIEVE	Mass Percent Passing Square Mesh Sieves
1 inch	100
3/4 inch	90 - 100
3/8 inch	55 - 75
1/4 inch	40 - 60 (1)

Note:
1. Of the fraction passing the 1/4 inch sieve, 40% to 60% shall pass the No. 10 sieve.

2.2.3 Rubblized Concrete

If additional rubblized concrete is needed for construction of the marker barrier (see Paragraph 3.7), then import rubblized concrete onsite from a commercially available source. Rubblized concrete shall be free of rebar and other metal products. Gradation shall be less than 6 inches in diameter and may include fines. Chemical testing shall be conducted as described in Section 01 45 10 IMPORT MATERIAL SAMPLING.

2.2.4 Oversize Material

If additional oversize material is needed for construction of oversize material-lined channels that cannot be developed from the on-site borrow source areas, then import oversize material onsite from a commercially available source. Gradation shall meet requirements for oversize material channels as shown on the Contract Drawings.

PART 3 EXECUTION

3.1 GOVERNMENT-FURNISHED BORROW SOURCE HAUL ROADS

Provide necessary signs, barricades, and distinctive markings for the safe movement of traffic. Dust suppression and road maintenance and/or repair shall be conducted as described in Section 01 57 20 ENVIRONMENTAL PROTECTION and Section 01 35 12 ROAD MAINTENANCE AND DUST CONTROL.

3.2 GOVERNMENT-FURNISHED BORROW SOURCE MATERIAL EXCAVATION

Tree clearing and grubbing activities at the Parcel H borrow source area shall be completed in accordance with Section 31 11 00 CLEARING AND GRUBBING; whereas, clearing activities at the ODOT borrow source area shall be completed by others.

The existing topsoil layer (i.e., top 6 inches of soil) shall be stripped and stockpiled separately. Install erosion controls surround the topsoil stockpile in accordance with Section 01 57 23 TEMPORARY EROSION CONTROL.

Following topsoil stripping activities, excavate overburden material from the borrow source areas in accordance with the approved Borrow Source Work Plan.

The government-furnished borrow source areas are expected to yield a suitable volume of overburden soil to generate materials to develop growth media and subsoil; however, the exact quantity of material available that meets the specifications shall be verified by the E&R Contractor.

Any remaining borrow source soils needed for restoration shall be a supplied by a contractor-furnished borrow source and tested as import material in accordance with Section 01 45 10 CHEMICAL DATA QUALITY CONTROL. Two private parcels west of the Parcel H government-furnished borrow have been previously tested and approved by the Government; however, access to the property has not yet been negotiated.

Restoration activities at the Parcel H borrow source area shall consist of replacement of top 6 inches of topsoil and seeding with native seed mix. Restoration activities at the ODOT borrow source area shall be performed by others.

3.3 SCREENING

Excavated overburden materials shall be screened to create growth media, subsoil, and oversize material. Screening shall be conducted using suitable mechanical separation methods to generate growth media, subsoil, and oversize material to meet sieve size requirements.

Approved screened material shall be used for site restoration as indicated on the Contract Drawings. If screened materials are generated prior to site restoration, materials shall be stockpiled outside of the limits of contamination.

3.4 STOCKPILING

Control sediment and stormwater run-on and run-off of restoration fill material stockpiles using erosion control methods as indicated in Section 01 57 23 TEMPORARY EROSION CONTROL. Maintain erosion and sediment control measures around and over the stockpiles. Restoration fill materials shall

not be stockpiled within the Operable Unit 1 (OU1) site boundary to prevent cross-contamination.

3.5 TESTING REQUIREMENTS

Tests of the screened material shall be made to verify compliance of the soil gradation and geotechnical properties.

A minimum of one gradation test per (ASTM D 422) 10,000 bank cubic yards (bcy) of material shall be performed for growth media overburden material.

Filter media sand and gravel samples shall be collected at a frequency of one sample per 200 cubic yards or a minimum of two samples per material type if less than 200 cubic yards is imported.

Gradation testing for import material such as gravel and filter media sand may be provided by the commercial source or quarry and submitted to the RA Construction Manager.

Subsoil, oversize material, and boulders will be visually inspected by the RA Construction for compliance with gradation requirements.

Include these testing requirements in accordance with Section 01 45 00 CONTRACTOR QUALITY CONTROL.

3.6 HAULING

Haul trucks and trailers shall have tarps secured over the beds before departing the restoration fill material loading area. Any damaged or inadequately covered trucks and trailers observed by the RA Construction Manager shall be immediately removed from service until the necessary repairs or corrections are made. Haul trucks and trailers shall comply with posted weight limits restrictions on county roads.

3.7 INSTALLATION OF MARKER BARRIER

The marker barrier shall consist of two layers of material as indicated on the Contract Drawings. First, install the rubblized concrete (see Section 02 41 00 DEMOLITION AND RESTORATION OF CONTAMINATED SOIL), 6 inches thick at the base of the excavation where visible asbestos-containing material (ACM) is left-in-place and excavation reached 4 feet below ground surface (bgs). Second, install an orange geotextile fabric, in accordance with Section 02 05 10 MARKER BARRIER GEOTEXTILE, on the rubblized concrete to provide additional warning and to mitigate sediment migration and subsidence. Backfill and a frost protective cap shall be installed over the orange geotextile.

3.8 PREPARATION OF SUBGRADE AREAS

Preparation of the frost protective cap subgrade shall not begin until the subgrade is free of visible ACM and the area has been inspected in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL or if a depth of 4 feet bgs has been reached.

Prior to the placement of subsoils, the excavation area shall be examined by the E&R Contractor and RA Construction Manager for any conditions detrimental to restoration. If any unfavorable conditions exist (e.g., saturated areas, snow, ice), backfilling shall not begin until conditions change.

The E&R Contractor is responsible for ensuring the subgrade areas are:

a. Sloped to allow water to drain away from building foundations, regardless of original grade

b. Not altered in any way that negatively affects or damages site materials or buildings as a result of poor site drainage conditions

Areas where drainage improvements are needed shall be performed on the subgrade following visual confirmation for ACM to ensure that the 2-foot frost protective cap is consistently maintained through these areas.

Subgrade slopes that are steeper than 3 Horizontal: 1 Vertical (3H:1V) shall be plowed, stepped, serrated, benched (minimum of 6 inches), or broken up so that the subgrade will bond with the subsoils as indicated on the Contract Drawings. For sloped areas less than 3H:1V, the surface shall be prepared by scarifying or other approved methods.

3.9 PLACEMENT OF SUBSOILS

Place subsoils for backfill of deeper excavation, for construction of the frost protective cap, and anchor trenches in a manner and sequence that will avoid damage to properties, houses, garages, or other existing features near the work areas.

Subsoil material shall be placed by the E&R Contractor using "clean-to-dirty" techniques. That is, subsoil material shall be end-dumped from a clean area and spread to make a path for subsequent loads ensuring that haul trucks do not drive over any contaminated areas.

For existing slopes steeper than 2H:1V, regrading, flattening, and buttressing with oversize material or riprap will be conducted for long term slope stability as directed by the RA Construction Manager. Flattening or buttressing will be performed such that the final slope is not steeper than 2H:1V.

A parcel-specific basis to determination will be made of what slope stability measures will be employed on each parcel. Site grading, earthwork, and site restoration should be performed in general accordance with the following criteria:

a. Backfill and cap material placed over existing terrain with slopes steeper than 5H:1V should be supported on horizontal benches cut into competent material. The benches should not exceed a maximum vertical height of 2 feet.

b. No backfill and cap material shall be placed until the RA Construction Manager verifies that the following requirements are met: (1) removal of unsuitable and contaminated soil (i.e., per visible ACM inspection protocol); and, (2) adequate benching of the backcut (as needed).

c. In areas of known flow channels and slope drainage areas, adequate protection should be provided to control potential scour. For any defined drainage pathways, swales, or channels, these features should be restored upon completion of slope grading. Surface water flow features should be protected with riprap, where indicated on the Contract Drawings.

3.9.1 Temporary Soil Cover for Onsite Repositories

Prior to completion of each construction season, temporarily cover each active repository with a minimum 6-inch layer of subsoil. It is anticipated that the Memorial Park repository will be completed during one construction season, and temporary soil cover will not be needed. Compaction is not required. Submit a repository winterization plan that includes means and methods of covering the repository with subsoil and installation of erosion controls. Install temporary erosion controls in accordance with Section 01 57 23 TEMPORARY EROSION CONTROL. Temporary orange construction fencing installed to delineate the exclusion zone at the repository will be required to remain in place after temporary soil cover is installed. Temporary fencing can only be removed once the permanent cap is installed.

3.10 COMPACTION OF SUBSOILS

Subsoil material shall be placed in lifts no greater than 12 inches and shall be compacted to at least 93 percent of the maximum dry density in accordance with ASTM D 698 and compacted with water content at, or higher than the optimum as determined by ASTM D 698.

Field density shall be determined by either the nuclear gauge method (ASTM D 6938) or the sand cone method (ASTM D 1556). Sufficient field density testing of the backfill and frost protective cap subsoils shall be made to determine the relative compaction of the fill. At least one density test shall be performed for each 1,000 cubic yards (cy) of material placed. At properties where less than 1,000 cy of material will be placed for restoration, a minimum of one test should be performed.

Maximum proctor density testing (ASTM D 698) of the subsoils shall be tested at a minimum of one test per 10,000 cy of material to determine optimal moisture content. Gradation sample locations shall coincide with the maximum density sample locations so that representative curves and soil types can be obtained for variable soil types. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

All work found unsatisfactory to the RA Construction Manager and not in compliance with required procedures described above shall be corrected by the E&R Contractor in an approved manner at Contractor's expense.

3.11 PLACEMENT OF GROWTH MEDIA

Place growth media as shown on the Contract Drawings. Growth media shall not be placed on subsoil surfaces that are muddy, frozen, or contain frost. Begin placing growth media in the opposite sequence of where subsoil material placement began (i.e., furthest point away from egress/ingress) and move towards that area such that haul trucks do not repeatedly drive over newly placed growth media. Correct any over-compaction of growth media deemed unsatisfactory as described in Section 32 92 19 GROWTH MEDIA AND SEED. Preparation of the growth media surface for seeding shall be completed in accordance with Section 32 92 19 GROWTH MEDIA AND SEED. Survey the final grades to ensure a total of 24 inches of frost protective cap has been installed.

Steeper slopes (greater than 3H:1V) exist in some isolated areas. These steeper areas are generally limited in extent with height no greater than 10 feet. An erosion control blanket shall be used in accordance with

Section 32 92 19 GROWTH MEDIA AND SEED in these areas to minimize erosion and surficial failure. Slope surface protection and seeding should be provided upon completion of final grading.

3.12 PLACEMENT OF OVERSIZE MATERIAL

Place oversize material in areas as shown on the Contract Drawings. Oversize material shall not be placed on surfaces that are muddy, frozen, or contain frost. Place oversize material such that:

a. Oversize material shall be placed in such manner as to produce a well-graded mass of stone with the minimum practicable percentage of voids.

b. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the borrow source locations. The larger stones shall be well distributed, and the entire mass of stones in their final position shall be roughly graded to conform to the gradation specified in this section. After placement, rearranging of individual stones may be required to the extent necessary to obtain a well-graded distribution of stone sizes as specified above.

c. Placing oversize material by dumping it at the top of the slope and pushing it down the slope will not be permitted. Placing oversize material in layers will not be permitted. Placing oversize material by dumping into chutes or by similar methods likely to cause segregation of the various sizes will not be permitted.

3.13 PLACEMENT OF BOULDERS

Boulders shall be individually placed in areas as shown on the Contract Drawings to restrict access to the onsite repositories or borrow areas.

3.14 PLACEMENT OF GRAVEL

Place gravel in areas as shown on the Contract Drawings. Compact gravel to form a firm and unyielding surface. Do not place material on surfaces that are muddy, frozen, or contain frost.

3.15 PLACEMENT OF FILTER MEDIA SAND

Sand shall be used in accordance in Section 02 41 00 DEMOLITION AND RESTORATION OF SITE FEATURES.

-- End of Section --

Attachment 1 - Existing Borrow Source Geotechnical Data

TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

Project #: **M11.1404.000**

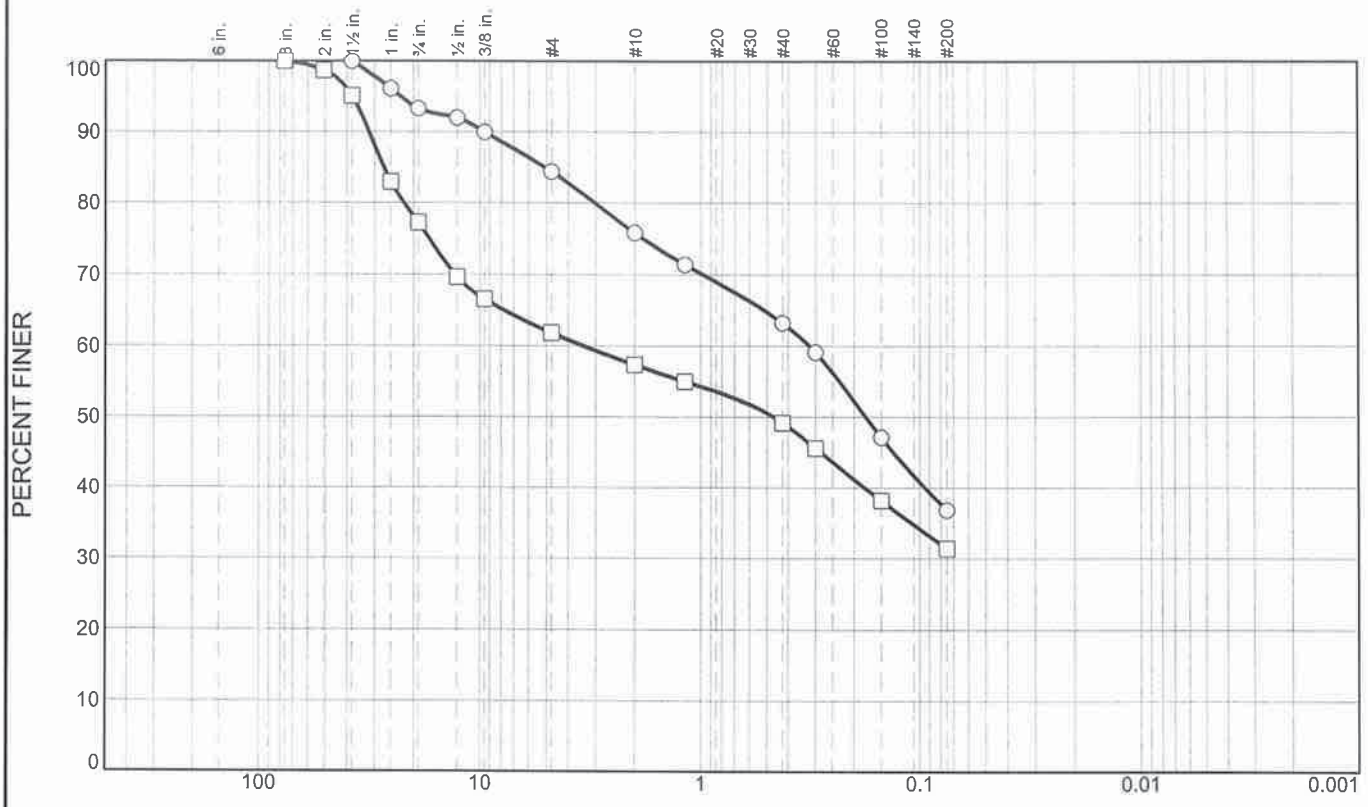
Client: **CDM Federal Programs Corporation**

Project Name: **North Ridge Estates**

Sample Location		Natural Moisture Content (%)	Natural Dry Density (pcf)	Gradation			Percent Passing No. 200 Sieve	Atterberg Limits		AASHTO Classification	Soil or Bedrock Description
Boring No.	Depth (feet)			Cobbles (%)	Gravel (%)	Sand (%)		Liquid Limit (%)	Plasticity Index (%)		
BSO1	Unknown	14.1		0	16	47	37	44	15	A-7-6(2)	Silty sand with gravel
		Standard proctor ASTM D 698 B; Uncorrected:MDD = 89.4 pcf; OM = 26.5%, Corrected: MDD = 92.4 pcf; OM = 24.7%.									
BSO2	Unknown	13.3		0	38	31	31	43	15	A-2-7(1)	Silty gravel with sand
		Standard proctor ASTM D 698 C; Uncorrected:MDD = 87.3 pcf; OM = 27.3%, Corrected: MDD = 93.4 pcf; OM = 23.1%.									

Parcel H and Adjacent Private Parcels Borrow Source

Gradation Test Results



	% +3"	% Gravel	% Sand	% Silt	% Clay
○	0	16	47	37	
□	0	38	31	31	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	44	29	5.0899	0.3204	0.1765					
□	43	28	27.3234	3.4272	0.4669					

	Material Description	USCS	AASHTO
○	silty sand with gravel	SM	A-7-6(2)
□	silty gravel with sand	GM	A-2-7(1)

Project No. M11.1404.000 **Client:** CDM Fedreal Programs Corporation

Project: North Ridge Estates

○ **Location:** BSO1 **Depth:** Unknown **Sample Number:** 5934-1

□ **Location:** BSO2 **Depth:** Unknown **Sample Number:** 5934-2

Remarks:

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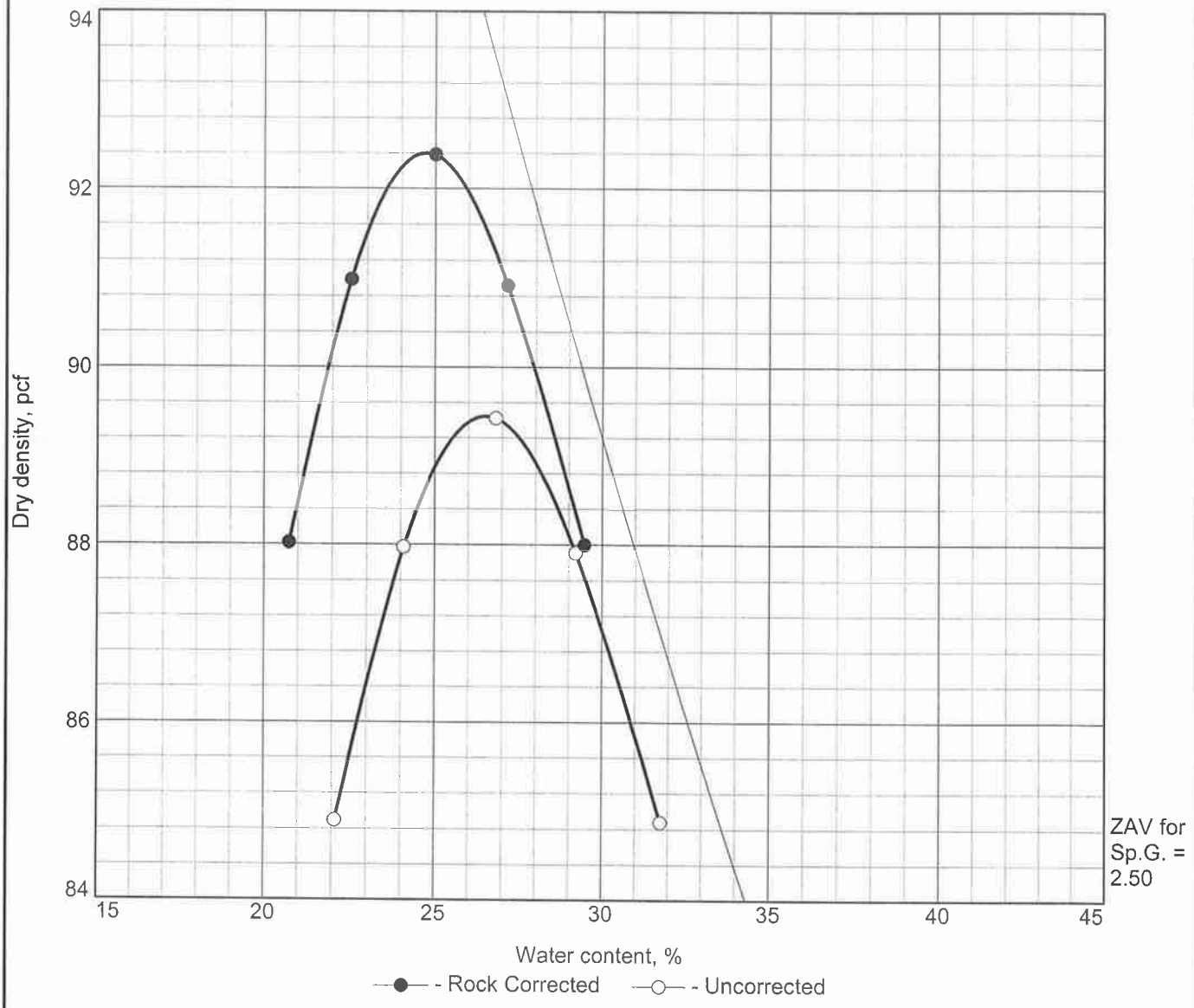
Figure BSO 1&2

Parcel H and Adjacent Private Parcels Borrow Source

Moisture-Density Relationship Test Results



Test specification: ASTM D 698-00a Method B Standard
Oversize corr. applied to each test point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
Unknown	SM	A-7-6(2)			44	15	10.0	37

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 92.4 pcf	89.4 pcf	silty sand with gravel
Optimum moisture = 24.7 %	26.5 %	

Project No. M11.1404.000 **Client:** CDM Fedreal Programs Corporation
Project: North Ridge Estates
Date:
○ **Location:** BSO1 **Depth:** Unknown **Sample Number:** 5934-1

Remarks:
Aggregate bulk specific gravity = 2.108.
Aggregate absorption = 8.7%.

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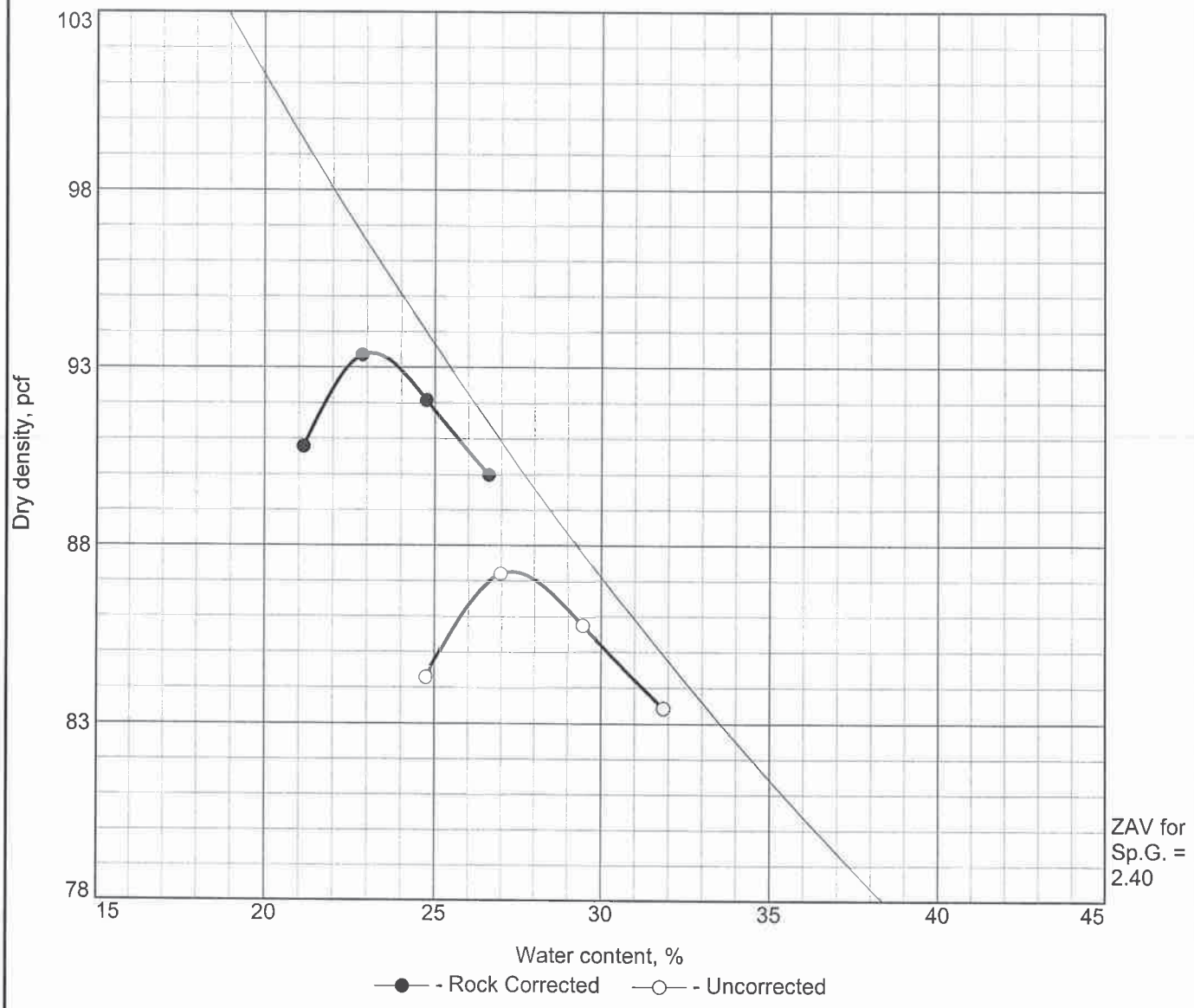
Figure BSO1

Moisture-Density Relationship Test Results



Test specification: ASTM D 698-91 Procedure C Standard
Oversize corr. applied to each test point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
Unknown	GM	A-2-7(1)			43	15	23.0	31

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 93.4 pcf	87.3 pcf	silty gravel with sand
Optimum moisture = 23.1 %	27.3 %	

Project No. M11.1404.000 **Client:** CDM Fedreal Programs Corporation
Project: North Ridge Estates
Date:
○ **Location:** BSO2 **Depth:** Unknown **Sample Number:** 5934-2

Remarks:
Aggregate bulk specific gravity = 1.957.
Aggregate absorption = 9.1%.

GEOCAL, INC.

Figure BSO2

TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

Project #: **M11.1404.000**

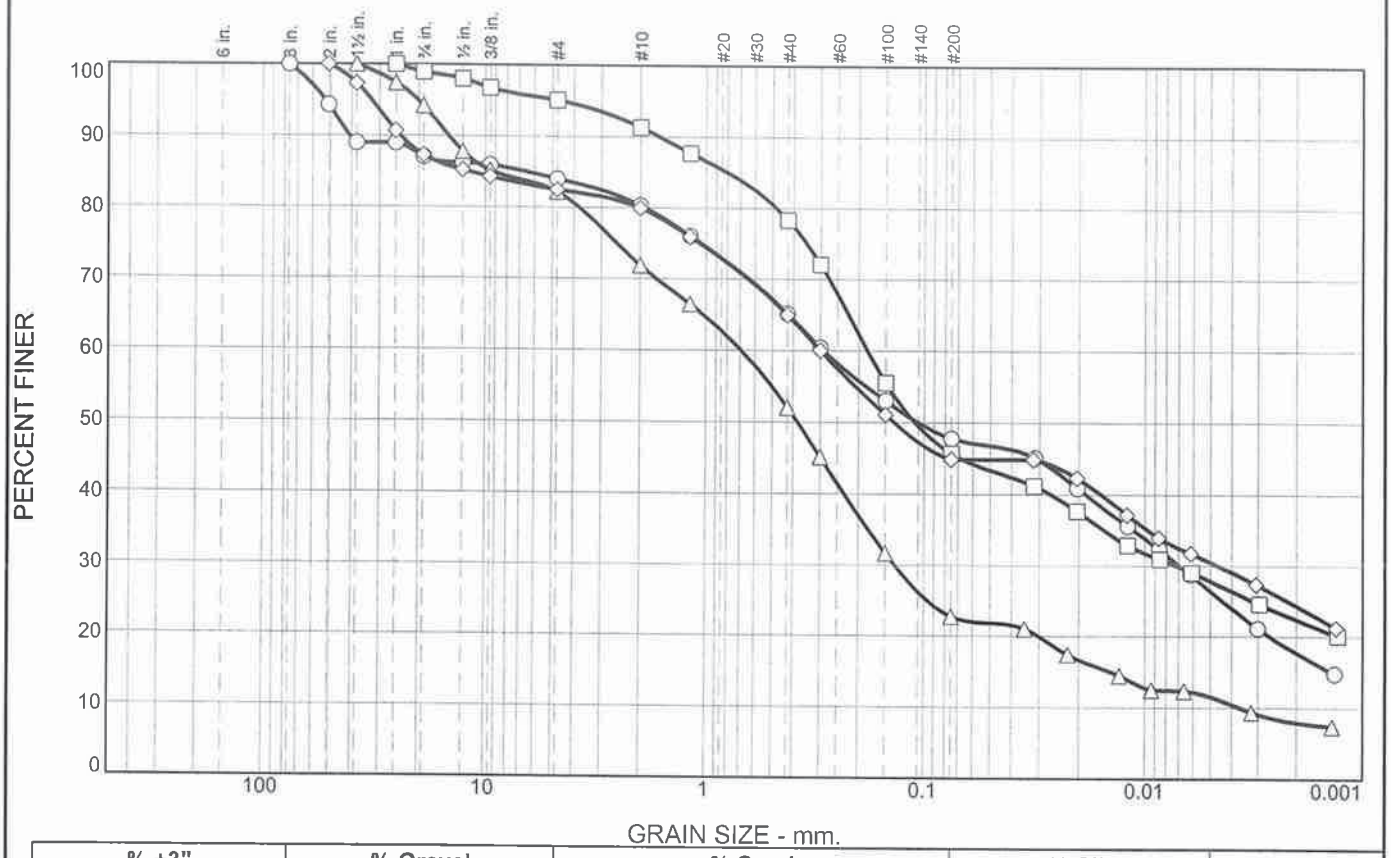
Client: **Camp, Dresser, McKee**

Project Name: **North Ridge Estates Borrow Material Investigation**

Sample Location		Natural Moisture Content (%)	Natural Dry Density (pcf)	Gradation			Percent Passing No. 200 Sieve	Atterberg Limits		AASHTO Classification	Soil or Bedrock Description
Boring No.	Depth (feet)			Cobbles (%)	Gravel (%)	Sand (%)		Liquid Limit (%)	Plasticity Index (%)		
DU-01	1-5	10.2		0	16	36	48	50	17	A-7-6(5)	Silty sand with gravel
		Standard proctor ASTM D 698 B; Uncorrected:MDD = 82.7 pcf; OM = 33.1%, Corrected: MDD = 87.3 pcf; OM = 29.5%.									
DU-02	1-5	17.0		0	5	49	46	38	15	A-6(4)	Clayey sand
		Standard proctor ASTM D 698 B; MDD = 92.2 pcf; OM = 26.2%,									
DU-03	1-5	18.5		0	18	59	23	61	7	A-2-5(0)	Silty sand with gravel
		Standard proctor ASTM D 698 B; Uncorrected:MDD = 78.3 pcf; OM = 35.3%, Corrected: MDD = 81.1 pcf; OM = 33.0%.									
DU-04	1-5	27.6		0	17	38	44	60	26	A-7-5(8)	Silty sand with gravel
		Standard proctor ASTM D 698 B; Uncorrected:MDD = 83.2 pcf; OM = 34.2%, Corrected: MDD = 88.2 pcf; OM = 30.4%.									

Oregon Department of State Land Borrow Source Area

Gradation Test Results



	% +3"	% Gravel	% Sand	% Silt	% Clay
○	0	16	36	22	26
□	0	5	49	18	28
△	0	18	59	11	12
◇	0	17	38	14	31

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	50	33	6.4030	0.2907	0.1064	0.0069	0.0014			
□	38	23	0.7963	0.1822	0.1100	0.0072				
△	61	54	9.1547	0.6927	0.3819	0.1359	0.0144	0.0037	7.25	188.23
◇	60	34	11.7178	0.2995	0.1371	0.0046				

	Material Description	USCS	AASHTO
○	silty sand with gravel	SM	A-7-5(6)
□	clayey sand	SC	A-6(4)
△	silty sand with gravel	SM	A-2-5(0)
◇	silty sand with gravel	SM	A-7-5(8)

Project No. M11.1404.000 **Client:** Camp, Dresser & McKee

Project: North Ridge Estates Borrow Material Investigation

○ **Location:** DU-01 **Depth:** 1-5 feet **Sample Number:** 6477-1

□ **Location:** DU-02 **Depth:** 1-5 feet **Sample Number:** 6477-2

△ **Location:** DU-03 **Depth:** 1-5 feet **Sample Number:** 6477-3

◇ **Location:** Du-04 **Depth:** 1-5 feet **Sample Number:** 6477-4

Remarks:

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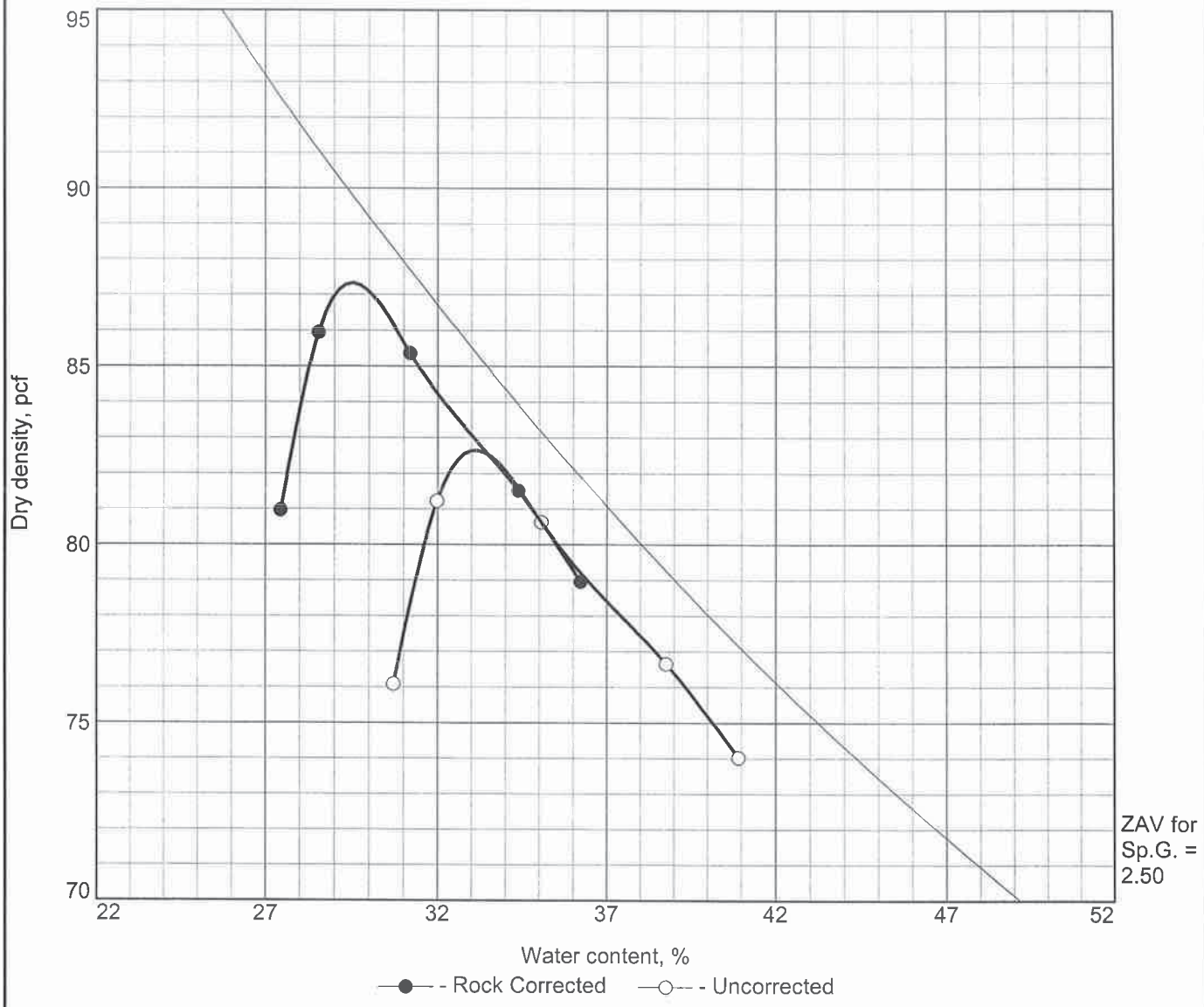
Figure 6477

Oregon Department of State Land Borrow Source Area

Moisture-Density Relationship Test Results



Test specification: ASTM D 698-91 Procedure B Standard
Oversize corr. applied to each test point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1-5 feet	SM	A-7-5(6)			50	17	14.0	48

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 87.3 pcf	82.7 pcf	silty sand with gravel
Optimum moisture = 29.5 %	33.1 %	

Project No. M11.1404.000 **Client:** Camp, Dresser & McKee
Project: North Ridge Estates Borrow Material Investigation

○ **Location:** DU-01 **Depth:** 1-5 feet **Sample Number:** 6477-1

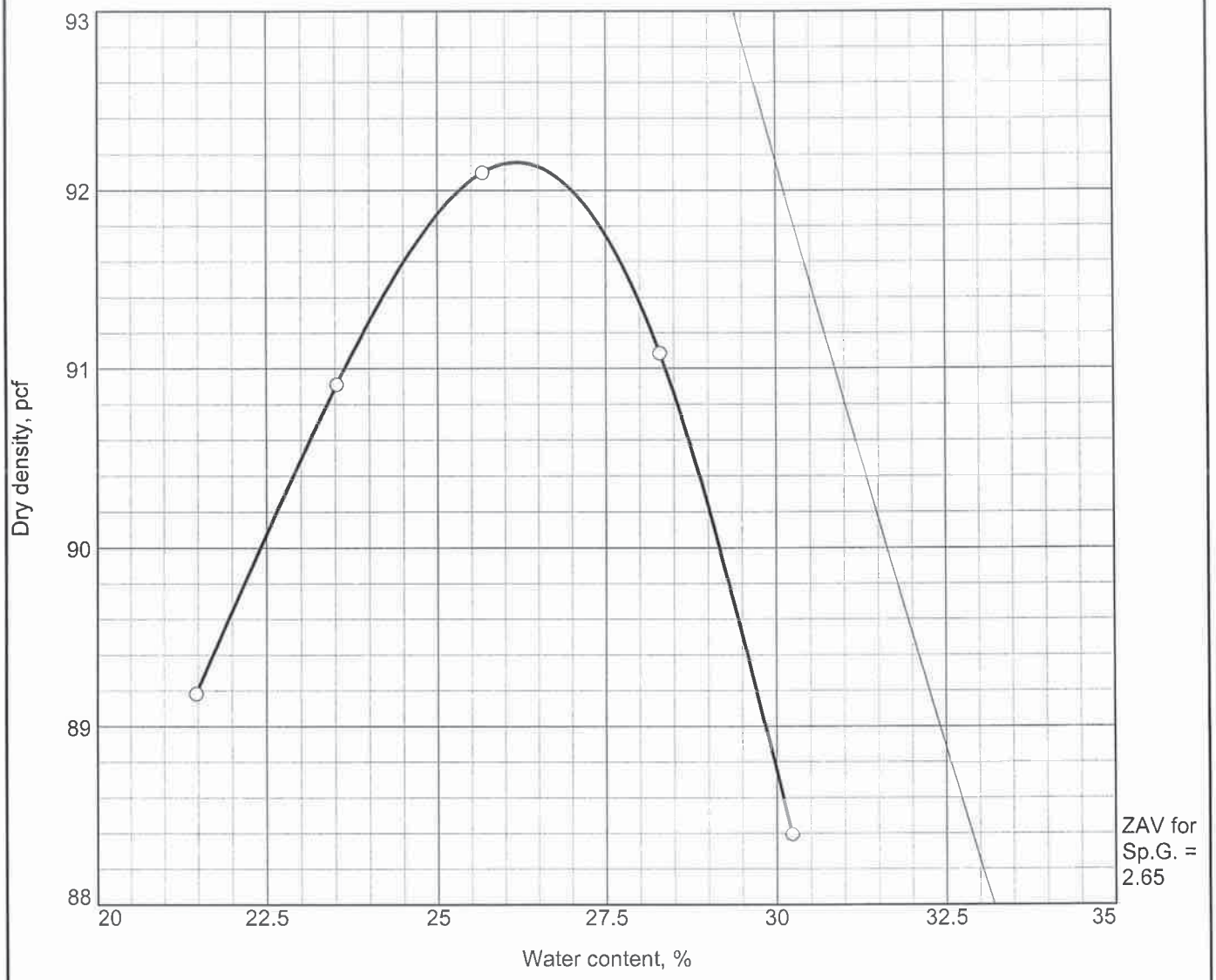
Remarks:
Aggregate bulk specific gravity = 2.140.
Aggregate absorption = 7.4

GEOCAL, INC.

Figure DU-01

Oregon Department of State Land Borrow Source Area

Moisture-Density Relationship Test Results



Test specification: ASTM D 698-91 Procedure B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1-5 feet	SC	A-6(4)			38	15	3.0	46

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 92.2 pcf Optimum moisture = 26.2 %	clayey sand

Project No. M11.1404.000 **Client:** Camp, Dresser & McKee
Project: North Ridge Estates Borrow Material Investigation

○ **Location:** DU-02 **Depth:** 1-5 feet **Sample Number:** 6477-2

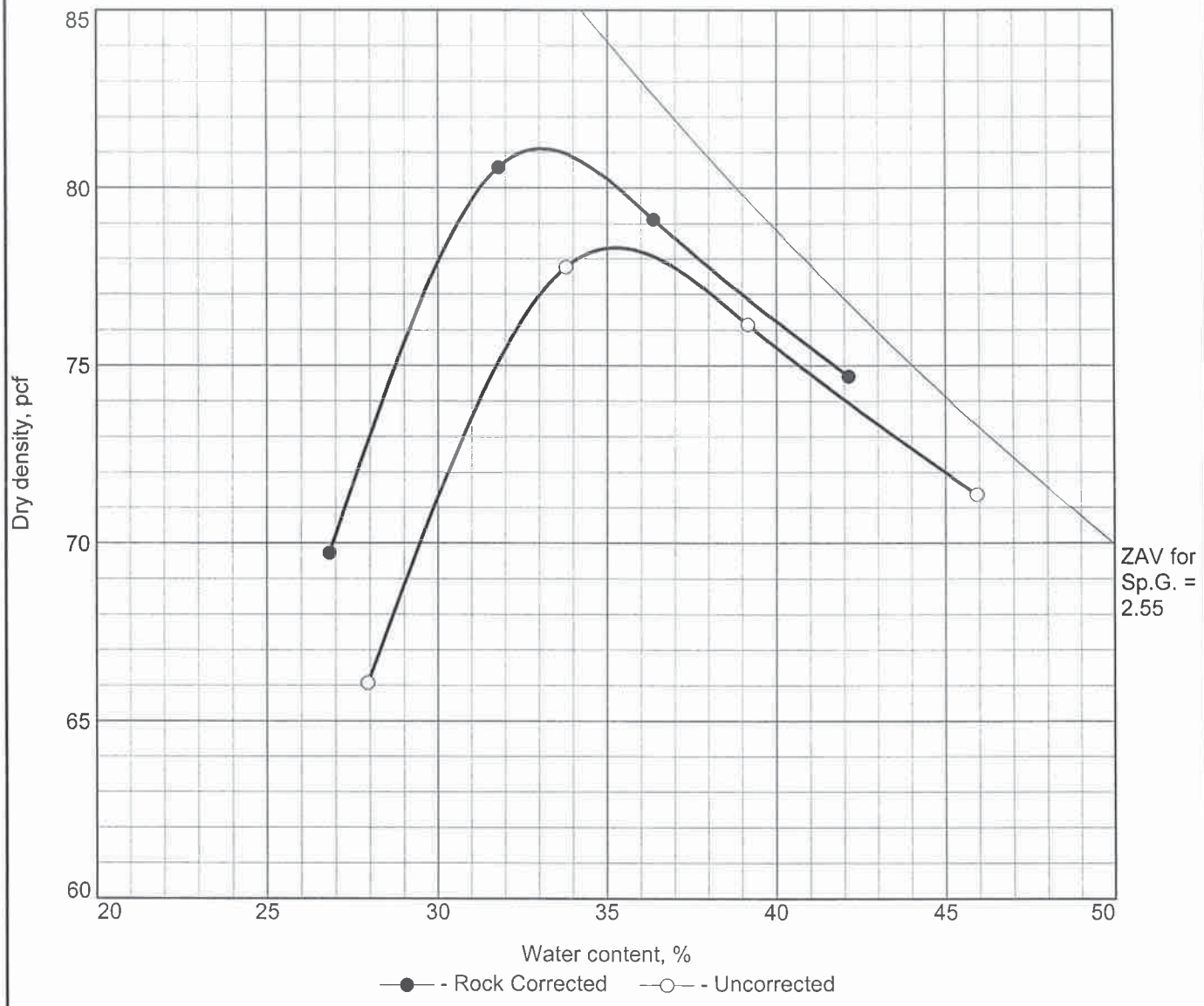
Remarks:

GEOCAL, INC.

Figure DU-02

Oregon Department of State Land Borrow Source Area

Moisture-Density Relationship Test Results



Test specification: ASTM D 698-91 Procedure B Standard
Oversize corr. applied to each test point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1-5 feet	SM	A-2-5(0)			61	7	15.0	23

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 81.1 pcf	78.3 pcf	silty sand with gravel
Optimum moisture = 33.0 %	35.3 %	

Project No. M11.1404.000 **Client:** Camp, Dresser & McKee
Project: North Ridge Estates Borrow Material Investigation

○ **Location:** DU-03 **Depth:** 1-5 feet **Sample Number:** 6477-3

Remarks:
Aggregate bulk specific gravity = 1.626.
Aggregate absorption = 20.5%

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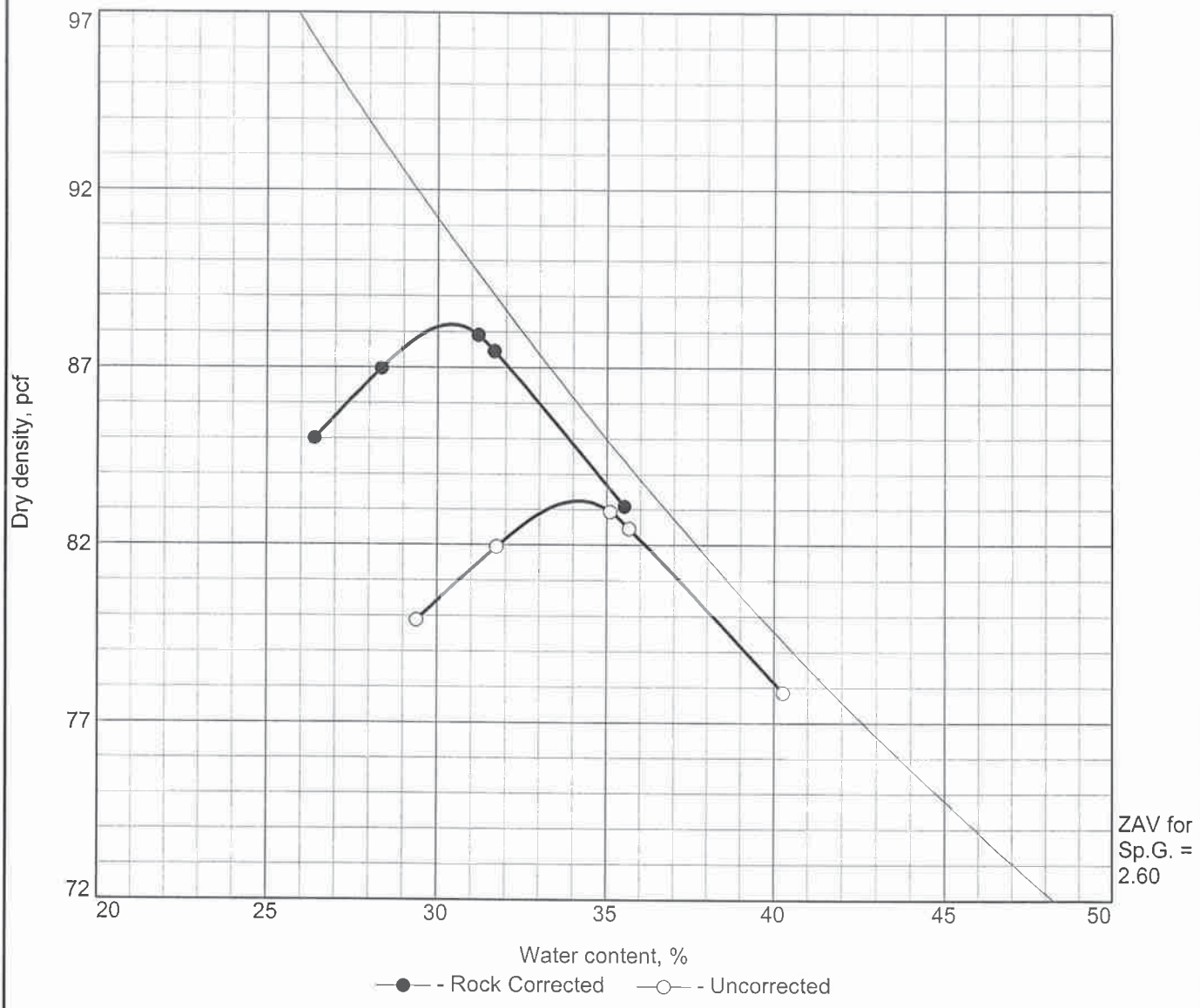
Figure DU-03

Oregon Department of State Land Borrow Source Area

Moisture-Density Relationship Test Results



Test specification: ASTM D 698-91 Procedure B Standard
Oversize corr. applied to each test point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1-5 feet	SM	A-7-5(8)			60	26	16.0	45

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 88.2 pcf	83.2 pcf	silty sand with gravel
Optimum moisture = 30.4 %	34.2 %	

Project No. M11.1404.000 **Client:** Camp, Dresser & McKee
Project: North Ridge Estates Borrow Material Investigation

○ **Location:** DU-04 **Depth:** 1-5 feet **Sample Number:** 6477-4

Remarks:
Aggregate bulk speciofic gravity = 2.055.
Aggregate absorption = 10.6%.

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Figure DU-04

Oregon Department of State Land Borrow Source Area

SECTION 32 12 17

HOT MIXED ASPHALT CONCRETE (ASPHALT)

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall consist of constructing one course of hot mixed asphalt concrete (HMAC) asphalt for replacement driveways, plant mixed into a uniformly coated mixture, hot laid on a prepared foundation, compacted to specified density, and finished to a specified smoothness in accordance with 2008 Oregon Department of Transportation (ODOT)/American Public Works Association (APWA) Standard Specification ODOT 00745.00, as modified herein.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

ASPHALT INSTITUTE (AI)

AI MS-02	(6th Edition; 1997) Mix Design Methods for Asphalt

OREGON DEPARTMENT OF TRANSPORTATION (ODOT)

ODOT 00745.00	2008 Standard Specification for Hot Mixed Asphalt Concrete

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-05 Design Data

Job-Mix Formula; G

Submit a job-mix formula in writing by the E&R Contractor for approval at least 14 days prior to preparing and placing the bituminous mixture for approval by the RA Construction Manager. Job-mix formula shall be in effect until modified in writing by the E&R Contractor and approved by the RA Construction Manager.

SD-06 Test Reports

Asphalt Mix Ticket

1.4 QUALITY ASSURANCE

1.4.1 Asphalt Mix Ticket

Submit the asphalt mix ticket upon delivery of the asphalt. The ticket

shall include:

a. Source and proportions, percent by weight, of each ingredient of the mixture

b. Correct gradation, the percentages passing each size sieve listed in the specifications for the mixture to be used, for the aggregate and mineral filler from each separate source and from each different size to be used in the mixture and for the composite mixture

c. Effective asphalt content as percent by weight of total mix

d. Temperature of the mixture immediately upon completion of mixing

PART 2 PRODUCTS

2.1 HOT MIXED ASPHALT CONCRETE (ASPHALT)

Develop the job-mix design that conforms to a Level 2, 1/2-inch dense, HMAC mixture per ODOT 00745.00. The asphalt mix shall be composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt material. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job-mix formula. The job-mix formula shall include as a minimum:

a. Percent passing each sieve size

b. Percent of asphalt cement

c. Percent of each aggregate and mineral filler to be used

d. Asphalt viscosity grade, penetration grade, or performance grade

e. Number of blows of hammer per side of molded specimen

f. Laboratory mixing temperature

g. Lab compaction temperature

h. Temperature-viscosity relationship of the asphalt cement

i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size

j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-02

k. Specific gravity and absorption of each aggregate

l. Percent natural sand

m. Percent particles with two or more fractured faces (in coarse aggregate)

n. Fine aggregate angularity

o. Percent flat or elongated particles (in coarse aggregate)

p. Tensile Strength Ratio

PART 3 EXECUTION

3.1 GENERAL

Place asphalt in areas as shown on the Contract Drawings for driveways and install asphalt to the lines, grades, and thickness as shown or established to match existing conditions, as shown on the Contract Drawings and in accordance with ODOT 00745.00

3.2 HAULING

Cover asphalt if rain or cold air temperatures are encountered any time between loading and placement. Asphalt will be rejected before placing if one or more of the following is found:

a. Below specified placing temperature limit

b. Slumping or separating

c. Solidifying or crusting

d. Absorbing moisture

Dispose of rejected loads at no additional cost to the RA Construction Manager. Deliver the mixture to the paving machine at a rate that provides continuous operation of the paving machine except for unavoidable delay or breakdown. If excessive stopping of the paving machine occurs during paving operations, the RA Construction Manager may suspend paving operations until the mixture delivery rate matches the paving machine operation at no additional cost.

3.3 DEPOSITING

Deposit asphalt from the hauling vehicles so segregation is prevented. When asphalt is windrowed, the pick-up equipment shall:

a. Pick up substantially all of the asphalt deposited on the roadway.

b. Be self-supporting, not exerting any vertical load on the paving machine, or causing vibrations or other motions that could have a harmful effect on the riding quality of the completed pavement.

3.4 PLACING

Alternative equipment and means may be allowed by the RA Construction Manager if the use of a paver is impractical. Do not place asphalt during rain or other adverse weather conditions unless allowed by the RA Construction Manager. Asphalt in transit at the time adverse conditions occur may be placed if:

a. It has been covered during transit.

b. The asphalt temperature is satisfactory.

c. It is placed on a foundation free from pools or flow of water.

d. All other requirements are met.

When leveling irregular surfaces and raising low areas, do not exceed 2 inches actual compacted thickness of any one lift except the actual compacted thickness of intermittent areas of 1,000 square feet or less may exceed 2 inches but not more than 4 inches.

-- End of Section --

SECTION 32 92 19

GROWTH MEDIA AND SEED

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall consist of temporarily seeding staging areas, stockpile areas, etc., and cover soils as shown on the Contract Drawings. This includes furnishing all labor, materials, equipment and incidentals required for the preparation of the seedbed (including soil amendments and fertilizers), handling and placement of seed, and installation of erosion control blankets along steep slopes.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act

U.S. COMPOSTING COUNCIL (USCC)

TMECC	Test Methods for the Examination of Composting and Compost

CALIFORNIA COMPOST QUALITY COUNCIL (CCQC)

CMI	(2001) Compost Maturity Index

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Erosion Control Blankets

SD-05 Design Data

Growth Media Development Plan

SD-06 Test Reports

Agronomic Soil Data

SD-07 Certificates

Residential and Native Seed Mixtures

Upon seed arrival at the site, documentation attesting that the mixtures meet the specified requirements shall be submitted.

Documentation shall include material source, composition, and certified analyses, as specified herein, and that the seed complies with applicable local, state, and federal regulations. Do not remove labels from the seed bags until the RA Construction Manager has inspected the labels. Supply the RA Construction Manager with all seed bag tags and accompanying documentation.

Following seeding, provide documentation including bag count or bulk weight measurements of seed applied compared with area covered to verify application rate.

Organic Matter Amendments

Prior to the delivery of compost, documentation attesting that the material meets the specified requirements shall be submitted. Documentation shall include material source, composition, and certified analyses as specified herein.

Bag count or bulk weight measurements of material used will be compared with area covered to determine the application rate and quantity installed.

Fertilizer

Certification of guaranteed analysis.

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.4 DELIVERY, STORAGE, AND HANDLING

The RA Construction Manager shall be notified a minimum of 24 hours prior to delivery of seeding and erosion control blanket materials. Materials shall be stored in designated areas and as recommended by the manufacturer, protected from the elements, direct exposure, and damage. Containers shall not be dropped from trucks. Material shall be free of defects that would void required performance or warranty.

a. Erosion control blankets shall be furnished in rolls with suitable wrapping to protect against moisture and extended ultraviolet exposure prior to placement. Erosion control blanket rolls shall be labeled to provide identification sufficient for inventory and quality control purposes.

b. Seed shall be inspected upon arrival at the job site for conformity to species and quality and proper documentation. Seed that is wet, moldy, or bears a test date 6 months or older or does not have the proper documentation, shall be rejected.

c. Organic matter (compost) soil amendment shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. Chemical testing shall be conducted as described in Section 01 45 10 CHEMICAL DATA QUALITY CONTROL.

d. Fertilizer shall be delivered to the site in the original, unopened bags bearing the manufacturer's chemical analysis.

Unacceptable materials shall be immediately removed from the job site and returned to the supplier or disposed of in accordance with regulations.

1.5 TIME RESTRICTIONS AND PLANTING CONDITIONS

Seeding shall be accomplished following placement of growth media at each parcel. Seeding may be accomplished at other times upon approval of the RA Construction Manager. Planting shall not be done when there is excessive wind or when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

PART 2 PRODUCTS

2.1 GROWTH MEDIA

Growth media shall be derived from the borrow locations and stockpiled in accordance with gradation requirements set forth in Section 31 23 00 EARTHWORK AND FILL. Develop a growth media development plan that describes sampling and processing techniques to amend the screened borrow material into growth media that meets the requirements specified herein. Agronomic testing data from vary soil depths at the ODOT and Parcel H borrow sources is provided as Attachment 1.

Growth media shall have a minimum organic matter content of 1.5 percent, either naturally or through the addition of an organic matter amendment. A minimum of one organic content sample per 2,500 bank cubic yards (bcy) of material shall be performed for growth media overburden material. A uniform grab of soil should be collected and placed in the sample bag, for a total sample volume of about 1 quart.

2.1.1 Organic Matter Amendments (Compost)

The organic matter amendment shall be mature, well composted material derived from the aerobic decomposition of plant material, manure, or biosolid sludge. The maturity of compost will be evaluated based on indices of stability and phytotoxicity.

<table>
<tr><th colspan="5">Compost Maturity Index (CMI)</th></tr>
<tr><td></td><td></td><td colspan="3">Phytotoxicity Ratings (Group B)</td></tr>
<tr><td></td><td></td><td>None</td><td>Low</td><td>High</td></tr>
<tr><td rowspan="3">Stability Ratings (Group A)</td><td>Very Stable</td><td>Very Mature</td><td rowspan="2">Mature</td><td rowspan="3">Immature</td></tr>
<tr><td>Stable</td><td>Mature</td></tr>
<tr><td>Less Stable</td><td colspan="2">Immature</td></tr>
</table>

Mature compost for this project is defined as having a phytotoxicity rating of low to none and a stability rating that is stable to very stable. Physical characteristics indicative of maturity include:

Color	Dark brown to black
Odor	Acceptable = none, soil like, musty, or moldy. Unacceptable = sour, ammonia, or putrid.
Particle Characterization	Some identifiable wood pieces are acceptable, but the majority of the material shall be soil-like without recognizable grass, needles, or leaves.

The compost material must be tested by a certified laboratory for the parameters listed below using the Test Methods for Evaluation of Compost and Composting (TMECC), or equivalent, to ensure that it has been appropriately aged, is not toxic, and will benefit the reclamation plant community.

Contaminants: Free of glass, metal, visible plastic, and any substance or characteristic toxic to plants or humans.

Gradation: Compost shall meet the following criteria:

Percent Passing	**Sieve Size**
100	1 3/4 Inch
90 - 100	1 Inch
85 - 100	3/4 Inch
30 - 60	No. 8
3 - 20	No. 35

Moisture Content: 35-60%.

Carbon to Nitrogen (C:N) Ratio: less than 25.

Organic Content: Minimum 35 percent based on dry weight.

pH: In the range of 6.0 to 8.0 standard units (SU).

Soluble Salts: Electrical conductivity (EC) less than 6 mmhos/cm.

Carbon Dioxide (CO_2) Evolution Rate: This measure of compost stability, must be less than 4 mg CO_2-C/g OM/d.

Ammonium to Nitrate (A:N) Ratio: less than 3.

Ammonia content: less than 500 milligrams per kilogram (mg/kg).

Agriculture (AG) Index: greater than 2 and preferably greater than 5.

Fecal Coliform: Pass U.S. Environmental Protection Agency (EPA) Class A Pathogen Standard.

Seed Germination (Emergence): greater than 80 percent.

Total Metals: Non-phytotoxic concentrations and must pass EPA Class A Metals Standard.

Compost is a very complex material and its properties can vary widely. Therefore, some relaxing of the above specifications may be possible upon request from the E&R Contractor and approval by the RA Construction Manager.

2.1.2 Fertilizer

Fertilizer shall be controlled release commercial grade, free flowing, uniform in composition, and consist of a nitrogen-phosphorus-potassium ratio. For residential areas, the fertilizer rate shall be a standard industry-acceptable rate for turf grass and must be approved by the RA Construction Manager.

The rate and type of fertilizer used shall achieve minimum soil concentrations in the growth media of: 30 mg/kg N; 8 mg/kg P, and; 100 mg/kg K. These concentrations are considered low for a native, wildland planting and are designed to provide minimal nutrients for the seeded species while not promoting weed growth. The following is provided as an example of the rates required using common forms of N, P, and K.

- If urea (46 percent N) is used, 150 pounds per acre (lbs/A) would be required.
- If triple super phosphate (46 percent P) is used, 150 lbs/A would be required.
- If potash (60 percent K) is used, 300 lbs/A would be required.

Other forms of N, P and K may be used providing the rates are adjusted to meet the soil concentrations as specified above.

2.2 SEED

2.2.1 Mixture Composition and Rate

Use the following residential and native seed mixtures for all restoration areas. The Residential Seed Mixture shall be utilized for site restoration surrounding occupied homes (see Contract Drawings). All remaining areas and along steeper slopes shall use the Native Seed Mixture.

Seed mixtures shall be sown at the following pounds of pure live seed (PLS) per unit area. Please note that the bulk seeding rate must be calculated based on the determined (actual) germination and purity of the seed of each species when the seed is mixed.

Table 1. Residential Seed Mixture

Common Name	Latin Name	Variety	% of mix*	Lbs of PLS/1,000 sq. ft.
Perennial Ryegrass	Lolium perenne	Indy	33	1.28
Kentucky Bluegrass	Poa pratensis	Argyle	33	0.13
Creeping Red Fescue	Festuca rubra	rubra	33	0.58
Totals			**100**	**2**

* The % of mix is based on the number of seeds per pound and therefore represents the actual composition of seeds on the ground.

Table 2. Native Seed Mixture

Common Name	Latin Name	Variety	% of mix*	Lbs of PLS/A
Idaho Fescue	Festuca idahoensis		20	2.71
Bluebunch Wheatgrass	Pseudoroegneria spicata		12	5.23
Bottlebrush Squirreltail	Elymus elymoides	Swezey	8	2.54
Sandberg Bluegrass	Poa sandbergii		11	0.64
Blue Wildrye	Elymus glaucus		12	5.38
Blue Flax	Linum perenne	Appar	8	1.67
Western Yarrow	Achillea millefolium	occidentalis	5	0.11
Low Sagebrush	Artemisia arbuscula		12	0.75
Green Rabbitbrush	Chrysothamnus viscidiflorus		12	0.94
Total			**100**	**20**

* The % of mix is based on the number of seeds per pound and therefore represents the actual composition of seeds on the ground.

The Native Seed Mixture rate is based on using the drill seeding method (i.e., the preferred method). If the broadcast seeding method is use, this rate shall be doubled.

2.2.2 Classification

Seed shall be premixed by the supplier prior to arrival at the site. In order to accomplish this, the bulk seeding rates must be calculated based

on percent viability of the seed (i.e., the percent purity and germination).

Mixed seed must be delivered in original sealed packages identifying the name and address of the supplier/producer. For each species in the mixture, the labels or accompanying documentation must provide species and variety name; harvest date (must be latest's season's crop); and producer's guaranteed analysis for species percentages of the mixture, purity, germination, weed seed content, inert material, pounds of PLS of each species, and the total pounds of PLS in the container. Documentation must demonstrate that mixtures are free from noxious weed seeds in accordance with the current state and local lists. Labels and other documentation must be in conformance with AMS Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will be rejected. Field mixing will be acceptable when it is performed on site in the presence of the RA Construction Manager.

2.2.3 Quality

The seed shall contain no prohibited noxious weed seed. The seed shall contain no restricted noxious weed seed in excess of the maximum numbers per pound as specified by the State of Oregon and Klamath County.

2.3 MULCH

Mulch shall be applied hydraulically and contain the following:

a. A minimum of 2,000 pounds of wood cellulose fiber mulch per acre

b. A commercially available tackifier approved by the RA Construction Manager. Tackifier application rate shall be per manufacturers' recommendations.

2.4 TEMPORARY EROSION CONTROL SYSTEMS

Erosion control system shall be implemented in accordance with Section 01 57 23 TEMPORARY EROSION CONTROL.

2.5 EROSION CONTROL BLANKETS

2.5.1 Erosion Control Blankets

Type IV blankets shall be used for erosion control during vegetation establishment on steep slopes where natural vegetation will provide long-term stabilization. Erosion control blanket shall be a machine-produced mat of 100 percent straw. The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. Cover the blanket on the top and bottom sides with lightweight photodegradable polypropylene netting having an approximate 1/2- by 1/2-inch mesh. Sew the blanket together on 1.5-inch centers with degradable thread. The erosion control blanket shall have the following properties:

Material Content

Straw:	100 percent with approximately 0.5 pounds per square yard (lb/yd2) weight.
Netting:	Both sides lightweight photodegradable with

approximately 1.64 pounds per 1,000 square feet (lb/1,000 ft2) weight.

Thread: Degradable

NOTE: Photodegradable life a minimum of 2 months with a minimum 90 percent light penetration. Apply to slopes greater than 3:1.

2.5.2 Staking

Stakes shall be 100 percent biodegradable manufactured from recycled plastic or wood and shall be designed to safely and effectively secure erosion control blankets for temporary or permanent applications. The biodegradable stake shall be fully degradable by biological activity within a reasonable time frame. The bio-plastic resin used in production of the biodegradable stake shall consist of polylactide, a natural, completely biodegradable substance derived from renewable agricultural resources. The biodegradable stake must exhibit ample rigidity to enable being driven into hard ground, with sufficient flexibility to resist shattering. Serrate the biodegradable stake on the leg to increase resistance to pull-out from the soil.

2.5.3 Staples

Staples shall be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 GROWTH MEDIA AGRONOMIC TESTING

Collect and analyze growth media samples every 1,000 cubic yards for agronomic properties to ensure soil meets the growth media amendment requirements of this section. Submit agronomic soil data, amendment rates, and recommendations as part of the growth media amendment plan.

3.2 GROWTH MEDIA AMENDMENT

Screened overburden for growth media (2-inch minus) shall be amended with organic matter, fertilizer, and pH adjuster (as required) to generate growth media. Amendments shall be added using one of the following two methods: (1) blending using a pugmill or equivalent mechanism prior to screened overburden placement or (2) blending into the placed screened overburden layer, top 6-inches of the frost protective cap. The method of amendment blending shall be determined by the E&R Contractor based on site conditions. For either method, amendment shall be added in accordance with the application rates as determined by the E&R Contractor in the growth media development plan. Application rates shall be determined by testing the agronomic properties of the overburden soils screened for growth media every 500 cubic yards.

Blending in-place (option 2) shall be implemented by using a plow designed to turn the soil, such as an offset disk plow, or mixing the material with other suitable method approved by the RA Construction Manager. Amendments shall be spread evenly over the growth media surface. Disk soil amendments into the growth media to create a uniform mixture to a depth of 6 inches below ground surface (bgs). The E&R Contractor will examine soil pits and determine how many passes with the plow are needed to achieve adequate incorporation of the organic matter into the upper 6 inches of growth media. Hand-mixing tools are required within the footprint of the septic

system drainfield areas.

3.3 SEEDBED PREPARATION

Following placement of growth media in accordance with Section 31 23 00 EARTHWORK AND BACKFILL, but prior to seeding, areas that have been compacted by construction operations shall be tilled by the E&R Contractor to a 6-inch depth with a ripper, chisel plow, or similar implement. This work shall be done on the contour so that furrows are perpendicular to the natural flow of water on sloped areas, unless otherwise directed by the RA Construction Manager. Growth media that has been placed within the footprint of the septic system drainfield areas and alternative drainfield replacement area(s) shall be roughened using handtools. This work will be deemed complete when the seedbed surface is considered moderately rough but smooth enough for a drill seeder.

3.4 SEEDING

3.4.1 Seed Application Seasons and Conditions

Seeding operations shall take place only when the wind velocity will allow for uniform seed distribution. Seeding shall not take place when the ground is muddy, frozen, snow covered, or in an unsatisfactory condition for seeding, as determined by the RA Construction Manager. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the RA Construction Manager stating the special conditions and proposed variance.

Apply seed within 24 hours after seedbed preparation. One-half of the seeding rate shall be sown in one direction, and one-half applied at a right angle to the first sowing.

3.4.2 Seed Application Method

The method of seeding the residential areas shall be to broadcast the seed directly onto the soil surface at the rate specified in Table 1 using a whirly bird seeder, or a similar piece of equipment, and then hand-raking the areas to partially cover the seed and otherwise provide good seed-soil contact. The seeding procedure shall ensure even coverage by uniformly broadcasting half the total rate of seed in one direction and the remainder of the seed rate broadcasted at 90 degrees from the first direction. Mulch shall then be applied to the residential areas as specified below.

The preferred method of seeding the native mixture (at the rate specified in Table 2) is with a Brillion seed drill or a similar piece of equipment. This type of seeder is composed of a double seed box centered over 2 culti-packer rollers that break up soil clods, create furrows into which the seed is dropped, and then cover the seed with soil and firm the seedbed. Each culti-packer roller is attached to floating axles that allow the rollers to follow the ground contour. The seeding depth gauge shall be set to plant seed 0.25 to 0.5 inches deep into the furrows. Seedbed preparation, such as harrowing, is required prior to seeding for best results.

Alternatively, seeding the native areas can be accomplished using the broadcasting method whereby seed is applied directly onto the soil surface and then the area is dragged with a devise, such as a piece of chain link fence or a harrow, to partially cover the seed. This method may be used

upon authorization by the RA Construction Manager. However, if broadcasting is used, the seeding rate shall be twice the drill seeding rate shown in Table 2.

3.5 FERTILIZING

Fertilizer may be applied during or after seedbed preparation at the rates specified in Section 2 or as determined in the growth media development plan, as approved by the RA Construction Manager.

3.6 MULCHING

Following seeding, hydraulic mulch shall be applied at the rate specified in Section 2.

3.7 WATERING

If seeding is performed during the dry summer months (from June 1 through September 30), seeded areas shall be watered by the E&R Contractor on a frequency sufficient to develop a satisfactory stand of grass during the seed establishment period. Watering by the E&R Contractor may be suspended if the property owner agrees to take over that responsibility. This determination will be made by the RA Construction Manager. In such cases, continue to monitor the property and make recommendations to the RA Construction Manager if they believe watering to be inadequate.

If seeding is performed in late fall (after approximately October 1), it may not be necessary to provide supplemental water; watering shall be conducted the following spring as necessary to ensure satisfactory growth. All watering decisions shall be made in consultation with the RA Construction Manager. Watering trucks shall not be driven over turf areas, unless otherwise directed by the RA Construction Manager.

3.8 PROTECTION OF SEEDED AREAS

Immediately after seedbed preparation, take measures to protect these areas against traffic and other use to prevent compaction.

3.9 REVEGETATION PERIOD (FIRST FULL GROWING SEASON)

3.9.1 Definition and Goal

The revegetation period is defined as one full growing season after seeding. For example, if seeding is conducted in the early spring (before June 1) then the revegetation period extends to October 15 of the same year. If seeding is conducted after June 1, then the establishment period extends from that time until October 15 of the following year. The goal is to obtain a robust stand of perennial, non-weedy vegetation by the end of the revegetation period that is capable of stabilizing the growth media against erosion. Written calendar time period shall be furnished for the revegetation period. If there is more than one period, the boundaries of the seeded area covered for each period shall be described and delineated on a site map or survey and provided to the RA Construction Manager. All seeded areas shall be maintained and guaranteed through the revegetation period.

3.9.2 Success Criteria

3.9.2.1 Germination Success

The success of the seeding(s) will be assessed via inspection beginning at the germination stage when plants are approximately 1 inch in height and shall continue monthly during the establishment period. A satisfactory stand of germinated seed in the residential grassed areas shall have an average density of grass seedlings greater than 50 per square foot. A satisfactory stand of germinated seed in the native grassed areas shall have a minimum of 20 seedlings per square foot. Areas exceeding 50 square feet that have less than these densities shall be re-seeded by hand. In addition, the entire area must be re-seeded if more than 10 percent of the seeded area fails to meet the above criteria. In this event, the RA Construction Manager must be notified immediately, and re-seeding shall not be initiated until the probable cause of the seeding failure is ascertained and permission is provided by the RA Construction Manager. Reseeding entire areas reestablishes the revegetation period.

3.9.2.2 Revegetation and Site Stability Success

The vegetation and erosion control inspection shall be conducted within the revegetation establishment period at peak growth in the late summer. An RA Construction Manager-furnished agronomist or ecologist shall perform the inspection with the E&R Contractor and RA Construction Manager. Time for the inspection shall be established in writing at least 10 days before the anticipated date.

Residential seeded areas shall be visually inspected. Success criteria are:

a. Average grass canopy cover greater than 80 percent.

b. No sparsely vegetated areas larger than 100 square feet. Sparsely vegetated areas are defined as having less than 40 percent cover.

c. No noxious weeds.

d. No soil erosion.

Native seeded areas shall be inspected using pace transects located approximately 25 feet apart and running the length of the reclaimed area. The agronomist or ecologist shall walk each pace transect line, noting the percent coverage of plant groups: seeded species, other desirable plant species, noxious weeds, and other weedy species. The agronomist or ecologist shall also note the condition of the surface soil with respect to surface water and soil movement. The following define the acceptable vegetation and erosion control criteria.

a. Total perennial, non-weedy plant canopy cover greater than 25 percent. Noxious weeds do not count toward desirable canopy cover.

b. Sparsely vegetated areas must not total more than 10 percent of a seeded area and no individual bare area shall be greater than 100 square feet (ft2). These areas are defined as having less than 10 percent acceptable vegetation cover. Bedrock outcrops or boulders do not count toward bare ground.

c. Greater than five seeded species with greater than 1 percent canopy cover.

d. Noxious weeds must have less than 1 percent canopy cover.

e. Some surface water flow patterns are acceptable, but these must be small and infrequently observed. The movement of soil, rock, and plant litter must be considered low to moderate for a rangeland site. There cannot be any actively eroding rills or gullies. Rills, if present, must not be deeper than 1 inch and spaced at intervals over 10 feet. Gullies cannot be deeper than 6 inches.

3.9.3 Maintenance during Revegetation Period

Maintenance of the seeded areas shall include eradicating weeds, protecting embankments and ditches from surface erosion, maintaining erosion control materials and mulch, protecting seeded areas from traffic, watering, and post-seeding fertilization. Document all maintenance activities and include in the operations and maintenance (O&M) manual in accordance with Section 01 78 00 CLOSEOUT SUBMITTALS.

a. Weed Control. The reclaimed areas shall be inspected for weeds each month during the establishment period. Weeds are defined as all plants considered by the state and county to be noxious or undesirable weed species. Noxious weeds are those regulated by law or those that are difficult to control. In general, noxious weeds are non-native plants that compete with desirable plants for nutrients, water, and/or space. Weed control measures shall be consistent with those recommended by the county.

b. Areas containing abundant weeds shall be hand-sprayed (i.e., spot sprayed) with a broadleaf herbicide. Only those areas containing weeds shall be sprayed (i.e., the entire reclaimed areas shall not be blanket sprayed). Spraying shall be completed in this manner that ensures the complete protection of the seeded forbs and shrubs and vegetation in adjacent areas. This is especially critical in residential seeded areas where there will be ornamental plants susceptible to herbicide. In the residential seeded areas, pulling weeds by hand in some areas may be better than herbicide use. The RA Construction Manager will make this determination. Also, grass seedlings can be susceptible to broadleaf herbicides so weed spraying must be done judiciously. Herbicides shall not be applied if wind could carry the chemicals to the planted shrubs and trees, or off site. Herbicides shall be applied by a licensed certified applicator in accordance with EPA label restrictions and recommendations.

c. Repair or Reinstall. Unsatisfactory stands of plants and mulch shall be reseeded and eroded areas shall be repaired. On slopes, provide a means to protect against washouts by an approved method such as armoring with oversize material or installing additional erosion control devices as described in Section 01 57 23 TEMPORARY EROSION CONTROLS. Any washout that occurs shall be regraded and reseeded at the Contractor's expense until a stand of grass or grass/forbs/shrubs is established that meets the success criteria established herein.

d. Watering. Watering shall be conducted in accordance with Paragraph WATERING above.

3.10 FINAL INSPECTIONS AND ACCEPTANCE

3.10.1 Preliminary Inspection

The preliminary revegetation inspection shall be conducted prior to the end of the first full growing season at peak growth (i.e., mid to late summer). Time for the inspection shall be established in writing at least 10 days before the anticipated date. Deficiencies noted during the preliminary inspection that do not meet the requirements defined herein shall be corrected to allow for final inspection.

3.10.2 Final Inspection

A final inspection shall be held by the RA Construction Manager and E&R Contractor to determine that deficiencies noted in the preliminary inspection have been corrected and to evaluate vegetation cover and other plant community attributes. Time for the inspection shall be established in writing at least 10 days before the anticipated date.

3.10.3 Inspection/Acceptance Criteria

Written final acceptance of the revegetation work will be given by the RA Construction Manager to the E&R Contractor upon meeting the revegetation success criteria listed above.

-- End of Section --

Attachment 1 - Agronomic Data from Borrow Source Areas

MEMORANDUM

Date: February 25, 2014

To: Ms. Katie Robertson, R.G.
Project Manager
Oregon Department of Environmental Quality

From: Stuart Albright, P.E.

Re: Agricultural Soil Analysis Results
North Ridge Estates Borrow Site
Klamath County, Oregon
2014-01

We have completed the agricultural sampling requested by EPA for the Lot 4400 borrow site. The subject site is an 80 acre parcel located northeast of Klamath Falls. The site is proposed for use as a borrow source for the remediation of the North Ridge Estates project, located east of the subject site.

Apex completed a sampling effort on February 4, 2014. The work consisted of collecting 10 shallow surface samples and subsurface composite samples which were sent to our subcontract testing laboratory (A&L Western Agricultural Labs) for testing.

Photographs of the sample locations are included in the attached photo log. The laboratory test results are also attached to this memo. Location descriptions are included in the attached table.

Sample ID	Description of Representative Vegetation	latitude	longitude	Elevation (ft amsl)
A-1	Ridge - Open Sagebrush	42.266454	-121.773584	4933.06
A-2	Beneath Tree Canopy	42.267926	-121.769799	4828.99
A-3	Opportunistic - Lowland Basin Area with Limited Surface Vegetation	42.268006	-121.770295	4842.39
A-4	Subsurface Composite of TP-3 (1-10' bgs)	42.266721	-121.769921	4874.78
A-5	Open Grass Area Within Forest	42.266719	-121.769918	4874.72
A-6	Drier Area, Low Scrub	42.266031	-121.770791	4921.24
A-7	Subsurface Composite of TP-5 (1-10' bgs)	42.267347	-121.770963	4892.06
A-8	Subsurface Composite of TP-6 (1-10' bgs)	42.267818	-121.768505	4857.37
A-9	Medium Scrub	42.267878	-121.768521	4851.85
A-10	Grassland Area	42.253607	-121.758885	4551.19

Datum: WGS 84

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 1	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-1 Location	

Photo No: 2	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-1 Location	

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 3	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-2 Location	

Photo No: 4	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-2 Location	

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 5	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-3 Location	

Photo No: 6	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-3 Location	

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 7	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-4 Location (Subsurface Composite of exploration TP-3, 1-10' bgs)	

Photo No: 8	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-4 Location (Subsurface Composite of exploration TP-3, 1-10' bgs)	

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 9	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-5 Location	

Photo No: 10	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-5 Location	

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 11	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-6 Location	

Photo No: 12	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-6 Location	

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 13	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-7 Location (Subsurface Composite of exploration TP-5, 1-10' bgs)	

Photo No: 14	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-7 Location (Subsurface Composite of exploration TP-5, 1-10' bgs)	

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 15	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-8 Location (Subsurface Composite of exploration TP-6, 1-10' bgs)	

Photo No: 16	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-8 Location (Subsurface Composite of exploration TP-6, 1-10' bgs)	

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 17	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-9 Location	

Photo No: 18	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-9 Location	

APPENDIX A
PHOTOGRAPH LOG

Project Name: NRE Borrow Study
Project Number: 2014-01

Client: Oregon DEQ
Location: Klamath Falls, Oregon

Photo No: 19	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-10 Location	

Photo No: 20	
Photo Date: 2/04/2014	
Orientation:	
Description: Sample A-10 Location	

A & L WESTERN AGRICULTURAL LABORATORIES

1311 WOODLAND AVE #1 • MODESTO, CALIFORNIA 95351 • (209) 529-4080 • FAX (209) 529-4736

REPORT NUMBER: 14-044-047

CLIENT NO: 9999-D

SEND TO: APEX COMPANIES, LLC
3015 SW FIRST AVE
PORTLAND, OR 97201-

SUBMITTED BY: ADAM REESE

GROWER:

DATE OF REPORT: 02/19/14

SOIL ANALYSIS REPORT

SAMPLE ID	LAB NUMBER	Organic Matter		Phosphorus		Potassium	Magnesium	Calcium	Sodium	pH		Hydrogen	Cation Exchange Capacity	PERCENT CATION SATURATION (COMPUTED)				
		* % Rating	** ENR lbs/A	P1 (Weak Bray) **** * ppm	$NaHCO_3$-P (OlsenMethod) **** * ppm	K ***** * ppm	Mg *** * ppm	Ca *** * ppm	Na *** * ppm	Soil pH	Buffer Index	H meq/100g	C.E.C. meq/100g	K %	Mg %	Ca %	H %	Na %
A-1	59460	2.3M	76	11L	20**	334M	387M	2307M	7VL	6.1	6.7	2.5	18.1	4.7	17.6	63.6	14.0	0.2
A-2	59461	7.3VH	176	62VH	55**	737H	668H	2759L	6VL	5.9	6.2	4.3	25.5	7.4	21.5	54.0	17.0	0.1
A-3	59462	2.2L	75	31H	45VH	311M	1548VH	3700L	20VL	6.4	6.5	3.2	35.2	2.3	36.1	52.4	9.0	0.2
A-4	59463	3.4M	98	1VL	7L	49VL	2365VH	5399L	88VL	7.0	6.8	0.0	46.9	0.3	41.5	57.4	0.0	0.8
A-5	59464	2.9M	88	6VL	15L	391M	1530VH	4033L	9VL	6.2	6.3	4.6	38.3	2.6	32.8	52.5	12.0	0.1

** NaHCO3-P unreliable at this soil pH

SAMPLE NUMBER	Nitrogen NO_3-N ppm	Sulfur SO_4-S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Excess Lime Rating	Soluble Salts mmhos/cm	Chloride Cl ppm	NH4-N	PARTICLE SIZE ANALYSIS			
												SAND %	SILT %	CLAY %	SOIL TEXTURE
A-1	3VL	11M	0.9L	8M	28VH	1.5H	0.5L	L	0.2VL		2.3				
A-2	2VL	11M	2.1M	9M	67VH	1.3H	0.6M	L	0.2VL		2.4				
A-3	7L	3VL	1.1M	10M	65VH	2.5H	0.4L	L	0.2VL		4.7				
A-4	1VL	2VL	0.1VL	1VL	6L	0.3VL	0.2VL	L	0.1VL		2.1				
A-5	2VL	3VL	0.7L	8M	39VH	2.3H	0.5L	L	0.1VL		2.2				

* CODE TO RATING: VERY LOW (VL), LOW (L), MEDIUM (M), HIGH (H), AND VERY HIGH (VH).
** ENR - ESTIMATED NITROGEN RELEASE
*** MULTIPLY THE RESULTS IN ppm BY 2 TO CONVERT TO LBS. PER ACRE OF THE ELEMENTAL FORM
**** MULTIPLY THE RESULTS IN ppm BY 4.6 TO CONVERT TO LBS. PER ACRE P_2O_5
***** MULTIPLY THE RESULTS IN ppm BY 2.4 TO CONVERT TO LBS. PER ACRE K_2O
MOST SOILS WEIGH TWO (2) MILLION POUNDS (DRY WEIGHT) FOR AN ACRE OF SOIL 6-2/3 INCHES DEEP

This report applies only to the sample(s) tested. Samples are retained a maximum of thirty days after testing.

Mike Buttress, CPAg
A & L WESTERN LABORATORIES, INC.

A & L WESTERN AGRICULTURAL LABORATORIES

1311 WOODLAND AVE #1 • MODESTO, CALIFORNIA 95351 • (209) 529-4080 • FAX (209) 529-4736

REPORT NUMBER: 14-044-047

CLIENT NO: 9999-D

SEND TO: APEX COMPANIES, LLC
3015 SW FIRST AVE
PORTLAND, OR 97201-

SUBMITTED BY: ADAM REESE

GROWER:

DATE OF REPORT: 02/19/14

SOIL ANALYSIS REPORT

SAMPLE ID	LAB NUMBER	Organic Matter		Phosphorus		Potassium	Magnesium	Calcium	Sodium	pH		Hydrogen	Cation Exchange Capacity	PERCENT CATION SATURATION (COMPUTED)				
		* % Rating	** ENR lbs/A	P1 (Weak Bray) **** * ppm	$NaHCO_3$-P (OlsenMethod) **** * ppm	K ***** * ppm	Mg *** * ppm	Ca *** * ppm	Na *** * ppm	Soil pH	Buffer Index	H meq/100g	C.E.C. meq/100g	K %	Mg %	Ca %	H %	Na %
A-6	59465	1.4L	58	8VL	25M	183M	640VH	2180L	11VL	6.3	6.7	2.0	18.6	2.5	28.3	58.4	10.5	0.3
A-7	59466	3.5M	100	10L	9M	58VL	2290VH	6516M	33VL	6.7	7.1	2.4	54.1	0.3	34.8	60.1	4.5	0.3
A-8	59467	0.9L	48	5VL	7L	104L	850VH	2466L	36VL	6.6	7.0	1.3	21.0	1.3	33.3	58.7	6.0	0.8
A-9	59468	1.3L	56	41VH	39VH	609H	462H	2421M	6VL	6.6	6.8	1.1	18.6	8.4	20.4	65.0	6.0	0.1
A-10	59469	0.6L	41	29H	25M	367M	794VH	2579L	15VL	6.5	6.8	1.7	22.1	4.3	29.6	58.3	7.5	0.3

SAMPLE NUMBER	Nitrogen NO_3-N ppm	Sulfur SO_4-S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Excess Lime Rating	Soluble Salts mmhos/cm	Chloride Cl ppm	NH4-N	PARTICLE SIZE ANALYSIS			
												SAND %	SILT %	CLAY %	SOIL TEXTURE
A-6	3VL	7L	0.9L	7M	24H	2.6VH	0.5L	L	0.2VL		2.2				
A-7	1VL	1VL	0.1VL	1VL	11M	0.7L	0.3VL	L	0.1VL		2.1				
A-8	1VL	1VL	0.1VL	2L	16M	0.5L	0.2VL	L	0.1VL		2.1				
A-9	1VL	3VL	0.6L	5M	23H	1.6H	0.5L	L	0.2VL		2.2				
A-10	2VL	3VL	0.3VL	5M	20H	2.1H	0.5L	L	0.2VL		2.4				

* CODE TO RATING: VERY LOW (VL), LOW (L), MEDIUM (M), HIGH (H), AND VERY HIGH (VH).
** ENR - ESTIMATED NITROGEN RELEASE
*** MULTIPLY THE RESULTS IN ppm BY 2 TO CONVERT TO LBS. PER ACRE OF THE ELEMENTAL FORM
**** MULTIPLY THE RESULTS IN ppm BY 4.6 TO CONVERT TO LBS. PER ACRE P_2O_5
***** MULTIPLY THE RESULTS IN ppm BY 2.4 TO CONVERT TO LBS. PER ACRE K_2O
MOST SOILS WEIGH TWO (2) MILLION POUNDS (DRY WEIGHT) FOR AN ACRE OF SOIL 6-2/3 INCHES DEEP

This report applies only to the sample(s) tested. Samples are retained a maximum of thirty days after testing.

Mike Buttress, CPAg
A & L WESTERN LABORATORIES, INC.

Kuo Testing Labs
337 1st Avenue, Othello, WA 99344
Tel: (509) 488-0112 | Fax: (509) 488-01128

EA Engineering, Science, and Technology, Inc.,
405 State Highway 121 Bypass
Building C, Suite 100
Lewisville, TX 75067-8192

Subject: Soil Analysis Report

Kuo Testing Labs received 7 samples on 08/30/15 for analysis. These samples were assigned log in numbers of 2255-2261. Enclosed is the final report that consists of a summary report for the individual samples, a copy of the chain of custody, and a QC report.

General Lab Comments

The results provided in this report relate only to the items tested. The bag for sample NRE-15-AG-1 was torn slightly at the bottom. Only a small portion of the sample had leaked out of the sample bag and no corrective action was deemed necessary. All other samples were received without issue.

The samples were analyzed for organic matter, pH, electrical conductivity, sodium adsorption rate (SAR), soil texture, cation exchange capacity (CEC), plant available nitrogen, phosphorus, and potassium. The plant available nitrogen was broken up into nitrate and ammonia. Results are reported on a dry weight basis. Fertilizer recommendations are provided on the individual sample reports for turf as the primary crop.

If you have any questions regarding this report please contact our office.

Regards,

09/03/15

Owner, and Principal Chemist, Jonathan T. Cox PhD — Date
jonathan.cox@kuotestinglabs.com

Date:	09/03/15
Report No:	S45539-7
PM:	***Derek Wintle***
Client:	EA Engineering
Sampler:	Mark Jusayan
Field:	***NRE-15-AG-7***
Crop:	Turf

Kuo Testing Labs, Inc.

337 South 1st

Othello, Washington 99344

(509) 488-0112; Fax (509) 488-0118

Email: kuotest@atnet.net

Web: www.kuotesting.com

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SOIL ANALYSIS REPORT

Lab #	Depth	NO3 -N	NH4 -N	P Bray	K Acet	OM Walkley-Black	pH 1:2	EC	CEC Meq	Texture Class	Sand	Silt	Clay	-----Saturation Extract------ Ca	Mg	Na	SAR
	in	ppm	ppm	ppm	ppm	%		mmho/cm	/100g	hydrometer	%	%	%	ppm	ppm	ppm	
2261	0-6	1.0	7.0	19	471	7.15	6.2	0.21	36.0	Loamy Sand	71.2	22.0	6.8	33.7	13.8	11.5	0.42

Fertilizer Recommendations:

Nitrogen:	***275***	**Lbs per acre N (split application)**
Phosphorous:	***0***	**Lbs per acre P2O5**
Potassium:	***0***	**Lbs per acre K2O**
Sulfur:	***0***	**Lbs per acre actual S**
Boron:	***0***	**Lbs per acre actual B**
Zinc:	***0***	**Lbs per acre actual Zn**
Manganese:	***0***	**Lbs per acre actual Mn**
Copper:	***0***	**Lbs per acre actual Cu**
Iron:	***0***	**Lbs per acre actual Fe**

Date:	09/03/15
Report No:	S45539-6
PM:	***Derek Wintle***
Client:	EA Engineering
Sampler:	Mark Jusayan
Field:	***NRE-15-AG-6***
Crop:	Turf

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337 South 1st

Othello, Washington 99344

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Web: www.kuotesting.com

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SOIL ANALYSIS REPORT

Lab #	Depth	NO3 -N	NH4 -N	P Bray	K Acet	OM Walkley-Black	pH 1:2	EC	CEC Meq	Texture Class	Sand	Silt	Clay	-----Saturation Extract------ Ca	Mg	Na	SAR
	in	ppm	ppm	ppm	ppm	%		mmho/cm	/100g	hydrometer	%	%	%	ppm	ppm	ppm	
2260	0-6	1.3	5.8	35	585	4.87	6.6	0.21	24.3	Sandy Loam	63.2	32.0	4.8	36.3	11.0	9.52	0.36

Fertilizer Recommendations:

Nitrogen:	***280***	**Lbs per acre N (split application)**
Phosphorous:	***0***	**Lbs per acre P2O5**
Potassium:	***0***	**Lbs per acre K2O**
Sulfur:	***0***	**Lbs per acre actual S**
Boron:	***0***	**Lbs per acre actual B**
Zinc:	***0***	**Lbs per acre actual Zn**
Manganese:	***0***	**Lbs per acre actual Mn**
Copper:	***0***	**Lbs per acre actual Cu**
Iron:	***0***	**Lbs per acre actual Fe**

Date:	09/03/15
Report No:	S45539-5
PM:	***Derek Wintle***
Client:	EA Engineering
Sampler:	Mark Jusayan
Field:	***NRE-15-AG-5***
Crop:	Turf

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337 South 1st

Othello, Washington 99344

(509) 488-0112; Fax (509) 488-0118

Email: kuotest@atnet.net

Web: www.kuotesting.com

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SOIL ANALYSIS REPORT

Lab #	Depth	NO3 -N	NH4 -N	P Bray	K Acet	OM Walkley-Black	pH 1:2	EC	CEC Meq	Texture Class	Sand	Silt	Clay	-----Saturation Extract------ Ca	Mg	Na	SAR
	in	ppm	ppm	ppm	ppm	%		mmho/cm	/100g	hydrometer	%	%	%	ppm	ppm	ppm	
2259	0-6	3.5	5.0	24	289	3.13	6.2	0.14	16.3	Sandy Loam	57.2	36.0	6.8	26.9	10.8	9.21	0.38

Fertilizer Recommendations:

Nitrogen:	***280***	**Lbs per acre N (split application)**
Phosphorous:	***0***	**Lbs per acre P2O5**
Potassium:	***0***	**Lbs per acre K2O**
Sulfur:	***0***	**Lbs per acre actual S**
Boron:	***0***	**Lbs per acre actual B**
Zinc:	***0***	**Lbs per acre actual Zn**
Manganese:	***0***	**Lbs per acre actual Mn**
Copper:	***0***	**Lbs per acre actual Cu**
Iron:	***0***	**Lbs per acre actual Fe**

Date:	09/03/15
Report No:	S45539-4
PM:	***Derek Wintle***
Client:	EA Engineering
Sampler:	Mark Jusayan
Field:	***NRE-15-AG-4***
Crop:	Turf

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337 South 1st

Othello, Washington 99344

(509) 488-0112; Fax (509) 488-0118

Email: kuotest@atnet.net

Web: www.kuotesting.com

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SOIL ANALYSIS REPORT

Lab #	Depth	NO3 -N	NH4 -N	P Bray	K Acet	OM Walkley-Black	pH 1:2	EC	CEC Meq	Texture Class	Sand	Silt	Clay	-----Saturation Extract------ Ca	Mg	Na	SAR
	in	ppm	ppm	ppm	ppm	%		mmho/cm	/100g	hydrometer	%	%	%	ppm	ppm	ppm	
2258	0-6	2.0	8.5	20	294	2.83	6.0	0.12	16.9	Sandy Loam	55.2	36.0	8.8	16.0	7.0	25.9	1.36

Fertilizer Recommendations:

Nitrogen:	***275***	**Lbs per acre N (split application)**
Phosphorous:	***0***	**Lbs per acre P2O5**
Potassium:	***0***	**Lbs per acre K2O**
Sulfur:	***0***	**Lbs per acre actual S**
Boron:	***0***	**Lbs per acre actual B**
Zinc:	***0***	**Lbs per acre actual Zn**
Manganese:	***0***	**Lbs per acre actual Mn**
Copper:	***0***	**Lbs per acre actual Cu**
Iron:	***0***	**Lbs per acre actual Fe**

Date:	09/03/15
Report No:	S45539-3
PM:	***Derek Wintle***
Client:	EA Engineering
Sampler:	Mark Jusayan
Field:	***NRE-15-AG-3***
Crop:	Turf

Kuo Testing Labs, Inc.

337 South 1st

Othello, Washington 99344

(509) 488-0112; Fax (509) 488-0118

Email: kuotest@atnet.net

Web: www.kuotesting.com

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SOIL ANALYSIS REPORT

Lab #	Depth	NO3 -N	NH4 -N	P Bray	K Acet	OM Walkley-Black	pH 1:2	EC	CEC Meq	Texture Class	Sand	Silt	Clay	-----Saturation Extract------ Ca	Mg	Na	SAR
	in	ppm	ppm	ppm	ppm	%		mmho/cm	/100g	hydrometer	%	%	%	ppm	ppm	ppm	
2257	0-6	1.0	3.5	11	207	1.27	6.3	0.06	12.6	Sandy Loam	57.2	36.0	6.8	8.3	4.2	10.6	0.74

Fertilizer Recommendations:

Nitrogen:	***290***	**Lbs per acre N (split application)**
Phosphorous:	***32***	**Lbs per acre P2O5**
Potassium:	***0***	**Lbs per acre K2O**
Sulfur:	***0***	**Lbs per acre actual S**
Boron:	***0***	**Lbs per acre actual B**
Zinc:	***0***	**Lbs per acre actual Zn**
Manganese:	***0***	**Lbs per acre actual Mn**
Copper:	***0***	**Lbs per acre actual Cu**
Iron:	***0***	**Lbs per acre actual Fe**

Date:	09/03/15
Report No:	S45539-2
PM:	***Derek Wintle***
Client:	EA Engineering
Sampler:	Mark Jusayan
Field:	***NRE-15-AG-2***
Crop:	Turf

Kuo Testing Labs, Inc.

337 South 1st

Othello, Washington 99344

(509) 488-0112; Fax (509) 488-0118

Email: kuotest@atnet.net

Web: www.kuotesting.com

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SOIL ANALYSIS REPORT

Lab #	Depth	NO3 -N	NH4 -N	P Bray	K Acet	OM Walkley-Black	pH 1:2	EC	CEC Meq	Texture Class	Sand	Silt	Clay	-----Saturation Extract------ Ca	Mg	Na	SAR
	in	ppm	ppm	ppm	ppm	%		mmho/cm	/100g	hydrometer	%	%	%	ppm	ppm	ppm	
2256	0-6	2.8	6.3	27	334	3.18	6.0	0.11	18.1	Sandy Loam	51.2	40.0	8.8	16.0	6.0	15.7	0.85

Fertilizer Recommendations:

Nitrogen:	***280***	**Lbs per acre N (split application)**
Phosphorous:	***0***	**Lbs per acre P2O5**
Potassium:	***0***	**Lbs per acre K2O**
Sulfur:	***0***	**Lbs per acre actual S**
Boron:	***0***	**Lbs per acre actual B**
Zinc:	***0***	**Lbs per acre actual Zn**
Manganese:	***0***	**Lbs per acre actual Mn**
Copper:	***0***	**Lbs per acre actual Cu**
Iron:	***0***	**Lbs per acre actual Fe**

Date:	09/03/15
Report No:	S45539-1
PM:	***Derek Wintle***
Client:	EA Engineering
Sampler:	Mark Jusayan
Field:	***NRE-15-AG-1***
Crop:	Turf

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337 South 1st

Othello, Washington 99344

(509) 488-0112; Fax (509) 488-0118

Email: kuotest@atnet.net

Web: www.kuotesting.com

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SOIL ANALYSIS REPORT

Lab #	Depth	NO3 -N	NH4 -N	P Bray	K Acet	OM Walkley-Black	pH 1:2	EC	CEC Meq	Texture Class	Sand	Silt	Clay	-----Saturation Extract------ Ca	Mg	Na	SAR
	in	ppm	ppm	ppm	ppm	%		mmho/cm	/100g	hydrometer	%	%	%	ppm	ppm	ppm	
2255	0-6	3.8	6.0	28	331	2.65	6.1	0.12	17.9	Loam	51.2	40.0	8.8	19.0	7.1	10.4	0.52

Fertilizer Recommendations:

Nitrogen:	***280***	**Lbs per acre N (split application)**
Phosphorous:	***0***	**Lbs per acre P2O5**
Potassium:	***0***	**Lbs per acre K2O**
Sulfur:	***0***	**Lbs per acre actual S**
Boron:	***0***	**Lbs per acre actual B**
Zinc:	***0***	**Lbs per acre actual Zn**
Manganese:	***0***	**Lbs per acre actual Mn**
Copper:	***0***	**Lbs per acre actual Cu**
Iron:	***0***	**Lbs per acre actual Fe**

Date: 09/03/15

Report No: S45539-QC

PM: ***Derek Wintle***

Client: EA Engineering

Sampler: Mark Jusayan

Field:

Crop: Turf

Kuo Testing Labs, Inc.

337 South 1st

Othello, Washington 99344

(509) 488-0112; Fax (509) 488-0118

Email: kuotest@atnet.net

Web: www.kuotesting.com

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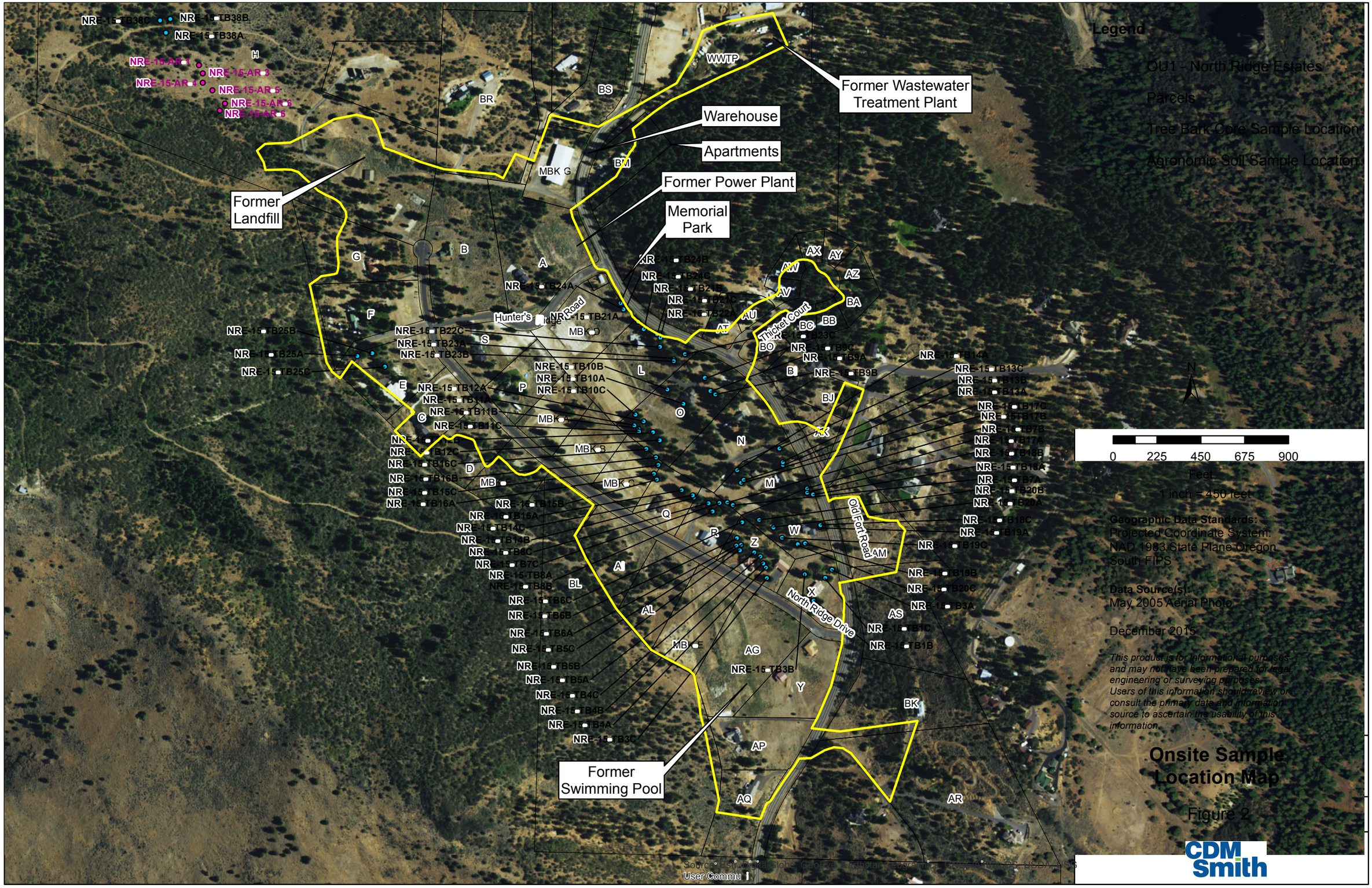
Analyte	Analysis Date	QC	Expected	Actual	recovery
P	8/31/2015	MB	0.00	1.00	N/A
P	8/31/2015	RefK	27.00	27.00	100.00
P	8/31/2015	ICV	2.50	2.52	100.92
P	8/31/2015	ICV	2.50	2.51	100.24
P	8/31/2015	BLK	0.00	0.10	N/A
K_7664	8/31/2015	ICV	400.00	407.30	101.83
K_7664	8/31/2015	MB	0.00	14.09	N/A
K_7664	8/31/2015	RefK	250.00	248.80	99.52
K_7664	8/31/2015	ICV	400.00	406.20	101.55
CEC	9/1/2015	MB	0.00	0.00	N/A
CEC	9/1/2015	ICV	0.88	0.85	96.75
CEC	9/1/2015	MB	1.00	0.95	95.08
CEC	9/1/2015	ICV	0.88	0.86	98.09
Ca_SAR	9/1/2015	ICV	50.00	49.01	98.02
Ca_SAR	9/1/2015	MB	0.00	-0.12	N/A
Ca_SAR	9/1/2015	RefK	150.00	154.60	103.07
Ca_SAR	9/1/2015	ICV	50.00	49.27	98.54
Mg_SAR	9/1/2015	ICV	5.00	5.12	102.38
Mg_SAR	9/1/2015	MB	0.00	-0.16	N/A
Mg_SAR	9/1/2015	RefK	50.00	48.52	97.04
Mg_SAR	9/1/2015	ICV	5.00	4.98	99.64
Na_SAR	9/1/2015	ICV	25.00	25.39	101.56
Na_SAR	9/1/2015	MB	0.00	2.20	N/A
Na_SAR	9/1/2015	RefK	100.00	104.20	104.20
Na_SAR	9/1/2015	ICV	25.00	25.08	100.32
NO3-N	8/31/2015	ICV	5.00	4.93	98.66
NO3-N	8/31/2015	MB	0.00	0.11	N/A
NO3-N	8/31/2015	REFK	57.00	57.49	100.85
NO3-N	8/31/2015	ICV	5.00	4.92	98.48
NH3-N	8/31/2015	ICV	5.00	4.98	99.51
NH3-N	8/31/2015	MB	0.00	0.07	N/A
NH3-N	8/31/2015	REFK	27.00	27.35	101.29
NH3-N	8/31/2015	ICV	5.00	4.91	98.21


Former Wastewater Treatment Plant
Warehouse
Apartments
Former Power Plant
Memorial Park
Former Landfill
Former Swimming Pool
WWTP
Hunter's Ridge Road
Thicket Court
Old Fort Road
North Ridge Drive
NRE-15-AR-1
NRE-15-AR-2
NRE-15-AR-3
NRE-15-AR-4
NRE-15-AR-5
NRE-15-AR-6
NRE-15-AR-7
Legend
OU1 - North Ridge Estates
Parcels
Tree Bark Core Sample Location
Agronomic Soil Sample Location
N
0 225 450 675 900
Feet
1 inch = 450 feet
Geographic Data Standards:
Projected Coordinate System:
NAD 1983 State Plane Oregon South FIPS
Data Source(s):
May 2005 Aerial Photo
December 2015
This product is for informational purposes and may not have been prepared for legal, engineering or surveying purposes. Users of this information should review or consult the primary data and information source to ascertain the usability of this information.
Onsite Sample Location Map
Figure 2
CDM Smith

SECTION 33 42 00

CULVERTS

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall consist of the installation of corrugated metal pipe at driveways and road crossings as shown on the Contract Drawings and as specified herein.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

ASTM INTERNATIONAL (ASTM)

ASTM A 929	(2007) Standard Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe

OREGON DEPARTMENT OF TRANSPORTATION (ODOT)

ODOT 00300	Standard Drawings - Drainage

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Corrugated Metal Pipe

Shop drawings showing layout, joint, method of manufacture, and installation of pipe and a schedule of pipe lengths.

SD-07 Certificates

Corrugated Metal Pipe

Prior to shipment of pipe, submit certified test reports that the pipe for this project was manufactured and tested in accordance with the standards specified herein.

1.4 QUALITY ASSURANCE

Inspection of the pipe shall be made by the RA Construction Manager at the point of fabrication or after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the specified requirements even though pipes may have been accepted as satisfactory at the place of fabrication. Pipe rejected after delivery shall be marked for identification and removed from the site.

1.5 DELIVERY, INSPECTION, STORAGE, AND HANDLING

The RA Construction Manager shall be notified a minimum of 24 hours prior to delivery of pipe materials. Materials shall be placed as indicated on the Contract Drawings or stockpiled at locations determined by the E&R Contractor until use. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be free of dirt and debris. Upon inspection, unacceptable materials shall be immediately removed from the job site. Handle materials in such a manner as to ensure delivery to their installation location in sound undamaged condition. Pipe shall be carried and not dragged.

PART 2 PRODUCTS

2.1 CORRUGATED METAL PIPE

The corrugated metal pipe shall be fabricated from zinc coated steel sheets conforming to ASTM A 929 and ODOT 00300. The pipe corrugations shall be 2 2/3-inches by 1/2-inch.

Pipe shall be riveted, bolted, or have resistance spot welded lap construction, or shall be fabricated with helical corrugations and a continuous lock or welded seam. The pipe and joints shall capable of withstanding an H-20 live load.

Minimum pipe gauges shall be as follows:

Pipe Diameter (inches)	**Minimum Gauge**
12 to 24	16
30 to 36	14
42 to 60	12

2.2 FITTINGS FOR CORRUGATED METAL PIPE

Joints: Furnish and install corrugated bands that mesh with the corrugations of the pipe ends. Bands shall be tightened by bolts through steel angles built into bands. Jointing bands shall be specifically fabricated for the pipe to be used.

PART 3 EXECUTION

3.1 PLACEMENT

Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe or fittings and the joint surfaces. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying, and no piece shall be installed that is found to be defective.

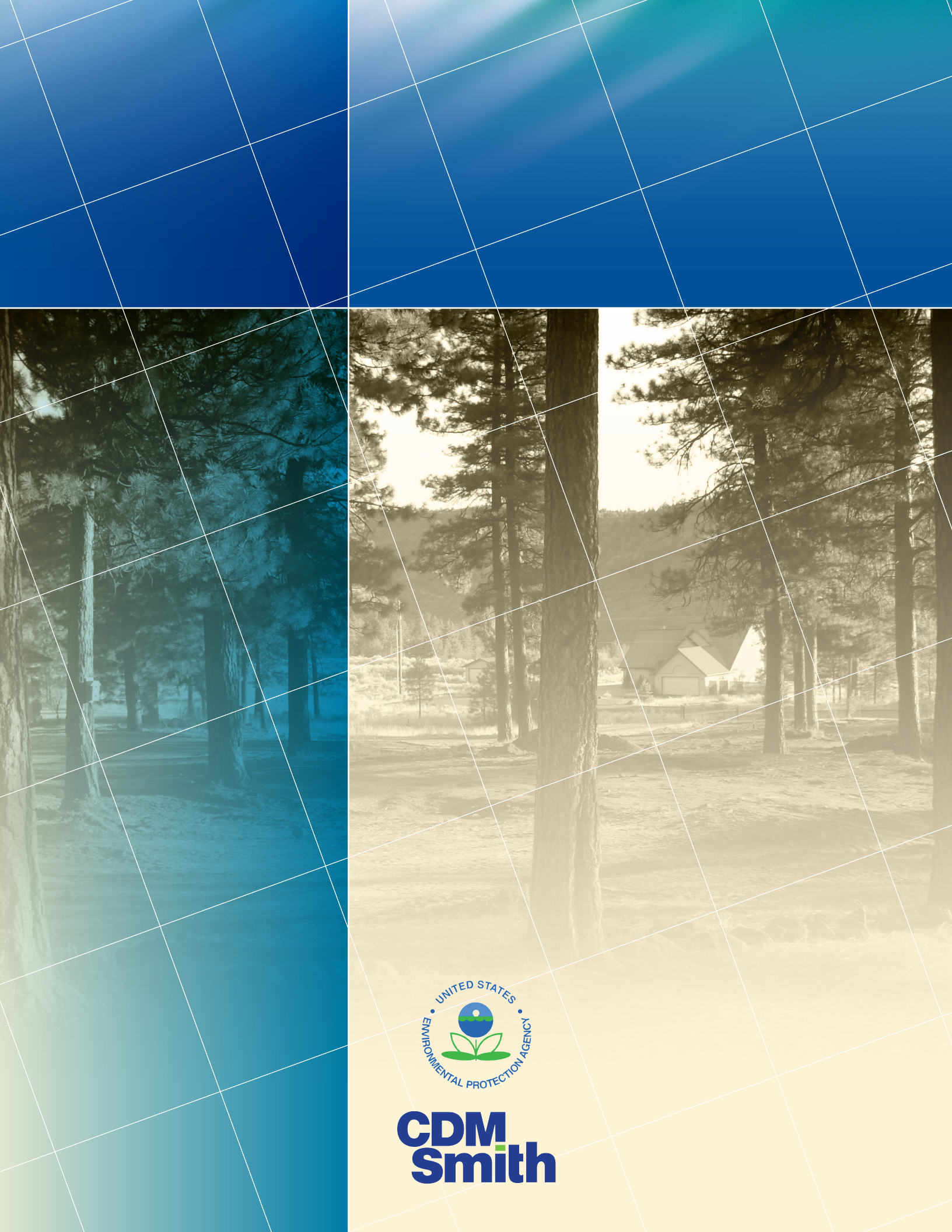
As soon as the excavation is completed to the required grade of the bottom of the trench, place gravel in the trench, and the pipe shall be firmly bedded in this gravel as indicated on the Contract Drawings. Blocking under the pipe will not be permitted. Gradation of gravel shall be in accordance with Section 31 23 00 EARTHWORK AND FILL.

Corrugated pipe ends shall bolt together. Keep dirt and gravel out of the joint so that corrugations will fit snugly. As the jointing band(s) are tightened, tap it with a mallet to take up slack and ensure a tight joint.

Holding the pipe section securely in place with jacks or come-along, place screened gravel backfill evenly on both sides of the pipe. Compact the backfill as it is placed. Continue backfilling and compacting until screened gravel is a minimum of 6 inches above crown of pipe.

Carefully regulate the equipment and construction operations such that the loading of the pipe does not exceed the loads for which the pipe is designed and manufactured. Any pipe damaged during construction operations shall promptly and satisfactorily be repaired or replaced at the Contractor's expense.

-- End of Section --


UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
CDM
Smith